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FOURTH BIENNIAL REPORT

OF THE

Reclamation Board of California

1918

CALIFORNIA STATE PRINTING OFFICE
SACRAMENTO
1918

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LETTER OF TRANSMITTAL.

SACRAMENTO, CALIFORNIA, December 31, 1918.

To His Excellency, Honorable WM. D. STEPHENS,
Governor of California.

SIR: The Reclamation Board of California herewith offers you for your consideration a report upon the progress and status of flood control plans and works within the Sacramento and San Joaquin Drainage District, and a resumé of the activities and accomplishments of this board to date.

Respectfully submitted.

THE RECLAMATION BOARD,
A. B. FLETCHER, *President.*
A. G. FOLGER, *Vice President.*
W. T. ELLIS, *Secretary.*
PETER COOK.
G. A. ATHERTON.
M. C. ZUMWALT.

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CHAPTER I.

BRIEF HISTORY OF RECLAMATION AND FLOOD CONTROL ENACTMENT, FOR THE SACRAMENTO AND SAN JOAQUIN VALLEYS, BY STATE LEGISLATURE AND UNITED STATES CONGRESS.

RECLAMATION RESPONSIBILITY TRANSFERRED FROM GOVERNMENT TO STATE.

1850. The federal government, by the passage of the "Arkansas Act," granted by patent to each state for the purpose of reclamation, all unsold swamp and overflowed lands within the latter's boundaries. The fee simple, thereafter vested in the state, was to be subject to the disposal of its legislature, provided that all proceeds from same be applied to the reclamation of said lands.

FROM STATE TO INDIVIDUAL.

1855. The state legislature passed an act providing for the sale of these lands at $1.00 per acre, with five years' time for payment, stipulating that no one purchaser could receive more than 320 acres, and also that, when purchased on time, at least one-half of the land purchased should be reclaimed within said period, otherwise forfeited. Only a few thousand acres were sold under this act.

1858. The act of 1855 was repealed and another act passed abolishing the credit system and the obligation to reclaim one-half of the land, and placing the $1.00 per acre in a swamp land fund with no provision for reclamation.

1859. The act of 1858 was amended by increasing the purchase limit from 320 to 640 acres, and by requiring only 20 per cent cash payment with five years' time on the balance.

STATE REASSUMES RESPONSIBILITY.

1861. The state assumed direct responsibility for reclamation by an act creating a board of five swamp land commissioners, each with an annual salary of $1,200, and appropriating $200,000 from the Swamp Land Fund. This board was authorized to appoint an engineer to plan reclamation of districts upon petition from the owners of one-third of the lands therein, and to expend $1.00 per acre upon the construction of the same providing the land owners subscribed for the balance of the cost. Twenty-eight districts made application under this act, including American Basin as No. 1, Sacramento Basin as No. 2 and Grand Island as No. 3.

1862. An act, supplementing former acts, was passed empowering county boards of supervisors, upon petition of owners of one-third of the land within a district, to levy assessments upon the lands of the district to complete the reclamation when the costs exceeded $1.00 per acre.

1863. Former acts were amended by reducing the salaries of the swamp land commissioners from $1,200 to $900 per annum. These commissioners reported in 1865 that fifty-four districts had been formed, the largest being No. 18—the entire Yolo Basin—in addition to the construction of the "Tule Canal."

RECLAMATION POWERS TRANSFERRED TO COUNTY SUPERVISORS.

1866. The act of 1861 was amended by abolishing the Board of Swamp Land Commissioners, and transferring their powers, duties and funds to the county boards of supervisors, with county surveyors acting as district engineers.

1868. For the purpose of attracting capitalists to undertake reclamation by permitting the acquisition of large bodies of land, an act was passed repealing former laws but re-enacting their general terms, and adding provisions for formation of districts, election of trustees and levying and collecting of assessments, also abolishing the maximum limit of land purchasable. Signatures of owners of one-half the land were necessary on petitions for the formation of districts. County supervisors were required to levy assessments upon presentation of plans by district trustees, and state patents were given after full and complete reclamation was established as evidenced by three years of successful cultivation. The boards of county supervisors did not follow a system of flood control or reclamation, as had the Board of Swamp Land Commissioners, but permitted the formation of districts of all sizes, shapes and conditions, even with overlaps, etc., often including the land of one owner only. Under this law the state parted with most of its swamp land holdings in about three years.

1872. The last act was amended by eliminating the requirement of three years' successful cultivation, and by providing for the granting of a patent for the land upon certificate of district trustees either that reclamation works had been completed, or that $2.00 per acre had been expended upon the same.

1874. The last two acts were amended by restoring the maximum limit purchasable by one person to 640 acres.

FORMATION SACRAMENTO RIVER DRAINAGE DISTRICT.

1878. By legislative act, the Sacramento River Drainage District, comprising all swamp and overflowed lands in Sacramento, Solano and Yolo counties, was created for the purpose of draining surplus waters of the Sacramento River, and waters from Coast Range Mountains, into Suisun Bay at Denverton. The plan included a main canal from Gray's Bend to Denverton, with a cross canal connecting with the Sacramento River near the mouth of the American River, and provided an appropriation of $10,000 for preliminary surveys. The commissioners of this district reported in 1879 that the scheme had failed, due to lack of any large, comprehensive flood control scheme including all districts in the Sacramento Valley and lowlands, which should control all relief and reclamation work, including the damaging effects of the mining debris problem.

STATE DEPARTMENT OF ENGINEERING CREATED.

The same legislature created the State Department of Engineering, charging it with investigation of problems of irrigation, drainage, and damage done to navigation and agriculture by hydraulic mining debris, and making an appropriation of $100,000 therefor. The State Engineer's Report two years later showed that by 1860 the debris from hydraulic mining had formed a bar across the Sacramento River at the mouth of the American River, and by 1866 had interfered with the landing of large steamers at Sacramento. This report recommended, among other things, systematized levee construction under state control, as opposed to existing individual reclamation district control, with a view to safely disposing of the flood waters as a whole.

CREATION BOARD OF DRAINAGE COMMISSIONERS.

1880. An act was passed creating a Board of Drainage Commissioners consisting of the Governor, Surveyor General and State Engineer, and giving it power to divide the state into drainage districts, the trustees of which (with assessment powers) were to be appointed by the Governor, and the plans of drainage to be prepared by the State Engineer. Under this act, Drainage District No. 1 was formed, comprising the area drained by the Sacramento River and its tributaries, and construction was commenced on restraining dams and river levees.

1881. Attempts to repeal the act of 1880 failed upon recommendation of committee, but in 1881 the State Supreme Court decided that the act of 1880 was unconstitutional because it delegated to state executive officers certain legislative powers, viz: those of creating districts. This resulted in the cessation, for a period of years, of the state's activities

in comprehensive flood control, and in a renewal of injunction proceedings against hydraulic mining, which latter were finally upheld by the Supreme Court in 1884.

DEBRIS INVESTIGATION AND LEGISLATION.

1884. Despite urgent messages, recommendations and petitions, no further state legislation was enacted for several years in connection with reclamation or flood control. In the meantime, however, and as far back as 1870, the United States Congress had been informed and petitioned, by the Anti-Debris Association and others, in connection with flood relief matters, and had authorized investigations by and received various reports from federal engineers.

1888. Congress authorized the Secretary of War to detail three engineer officers to investigate, and report upon, with recommendations, the conflict between mining and agricultural interests, the mining debris damage to navigation, and the possible improvement and rectification of river channels in the Sacramento Valley. The report of these army engineers in 1891 recommended the cessation of hydraulic mining, the impounding of debris by restraining barriers in the canyons, and the acceleration of currents and deepening of river channels by means of wing dams.

CREATION CALIFORNIA DEBRIS COMMISSION.

1893. By the passage of the "Caminetti Act," the United States Congress created the California Debris Commission for the purpose of controlling (and prohibiting where necessary) hydraulic mining, and of restoring navigation, as nearly as practicable, to the conditions existing prior to 1860. This commission was instructed to make annual reports, with plans, estimates and recommendations, to the Chief of Engineers for the information of the Secretary of War and of Congress.

By legislative act the state created the office of Debris Commissioner, who was to co-operate with the California Debris Commission, and to act as disbursing officer for the state in expending the appropriation of $250,000 provided for in this act for debris impounding works, which sum was to be made available when the federal government should appropriate an equal amount.

OFFICE COMMISSIONER OF PUBLIC WORKS CREATED.

The same legislature created the office of Commissioner of Public Works to investigate damage by flood and to prepare plans and estimates for flood control under the direction of the government. This commissioner's report in 1894 showed that over $18,000,000 had been spent to date in the Sacramento and San Joaquin valleys on reclamation,

but that flood control was a failure due to the absence of any comprehensive flood control, drainage or protective system or systems for the two valleys. It recommended the construction of a by-pass system at an expenditure of over $9,000,000, but this was not acted upon by the legislature. The report in 1896 by a subsequent commissioner recommended the expenditure of over $1,000,000 on the Sacramento River channel improvement below the mouth of the Feather River.

1897. An act was passed creating an auditing board for the Commissioner of Public Works, with an appropriation of $300,000 for river channel improvement and rectification. (During the twenty years beginning 1897 the state legislature has appropriated over $1,100,000 for river rectification and improvement, under the direction of the Commissioner of Public Works, until 1907, and since then under the State Department of Engineering.)

ORGANIZATION RIVER IMPROVEMENT AND DRAINAGE ASSOCIATION.

1902. The River Improvement and Drainage Association of California was organized at a mass meeting of swamp land owners, and succeeded in 1904 in obtaining the appointment (by the Commissioner of Public Works) of a commission of experienced army engineers, headed by Major Dabney, for the purpose of investigating and recommending a comprehensive system of flood control for the Sacramento and San Joaquin rivers and their tributaries. The recommendations of this commission were against the weir and by-pass system, and in favor of forcing all flood waters through the rivers, which were to be sufficiently enlarged by flood levees built a considerable distance back from the river banks.

FORMATION (SECOND) SACRAMENTO DRAINAGE DISTRICT.

1905. By legislative act the Sacramento Drainage District was created, comprising all swamp and overflowed lands in the Sacramento Valley north of the San Joaquin River, and its affairs were to be administered by a board of nine drainage commissioners elected by the landowners within the district. The powers of this board included the approval, formation, alteration, division and control of reclamation districts and works, appointment of trustees, levying of assessments and the duties theretofore performed by boards of county supervisors, but they were not to become effective until the state and federal government should jointly adopt the Dabney or some other plans for flood control and make appropriations therefor.

During the same year, Congress, in its Rivers and Harbors Bill, authorized the Secretary of War to appoint a board of three engineers of experience to investigate the flood control problem of the Sacramento

Valley, consulting with the state's engineering commissions for the purpose of ascertaining the federal government's proper share of river and navigation improvement in conjunction with state efforts. This board reported that the proposed flood control schemes were principally for the benefit of swamp and reclaimed landowners, and that the government's interests in navigation improvement were best cared for by the existing scheme of wing dams. The Sacramento Drainage District scheme thus failed and the creating act was later repealed.

LOWER SACRAMENTO RIVER IMPROVEMENT.

1909. The state legislature, as a result of the recommendation of the California Debris Commission in 1907, appropriated $400,000 toward the construction of two large suction dredges and their operation for fifty-six months removing debris from the lower Sacramento River channel.

1910. Congress adopted the recommendation of the California Debris Commission of 1907, and appropriated $400,000 to equal the appropriation of the state legislature for suction dredge construction and operation in the lower Sacramento River.

ADOPTION DEFINITE FLOOD CONTROL PLAN AND CREATION RECLAMATION BOARD.

1911. The Sacramento Drainage District was abolished by the repealing of the legislative act of 1905.

On June 27th of this year the Secretary of War transmitted to Congress the final report and recommendation of the California Debris Commission (known as House Document Number 81, 62d Congress, 1st Session) for a comprehensive flood control plan for the Sacramento Valley. This report was the result of several years' surveys and investigations, and recommended a complete by-pass system, with weirs and river levees, at an estimated cost of $33,000,000, with the suggestion that the federal government, the state and the landowners each bear one-third of the cost.

At a special session of the state legislature, called near the close of 1911, the "Reclamation Board Act" was passed, approving the final report of the California Debris Commission (Document Number 81), and creating a reclamation board of three members (to be appointed by the Governor), to which all applications for reclamation works in the Sacramento Valley must be made, and whose function it was to require all such plans to conform with the general flood control scheme just adopted. An appropriation of $10,000 was made for surveys and investigations by the State Engineering Department for the purpose of perfecting or modifying the plans above adopted.

A joint resolution was passed by the legislature urging the United States Congress to take favorable action upon the California Debris Commission's report then before the latter body.

1913. The Reclamation Board Act was amended by enlarging the membership of the Reclamation Board from three to seven members, by creating the Sacramento and San Joaquin Drainage District (see map of this district in Appendix) and placing it under the control and management of the Reclamation Board, by providing for the levying and collecting of assessments by the Reclamation Board—for such construction work as may be deemed a public necessity in carrying out the general flood control plan—and by giving the Reclamation Board power to acquire lands and rights of way and to construct flood control works. An appropriation of $100,000 was made, one-half of which was to be returned to the State Treasurer out of a subsequent administrative assessment.

1915. Additional slight amendments were made to the Reclamation Board Act improving methods of procedure of Reclamation Board acts, and the $50,000 which was to be returned to the State Treasurer, under the amendment of 1913, was reappropriated as a revolving fund for future use of the Reclamation Board.

An act was passed by the same legislature providing for a Water Problems Conference, at the call of the Governor, for the purpose of discussing and recommending state policy on matters pertaining to reclamation, flood control, water storage, irrigation and drainage matters. The report of this conference was printed and presented to the Governor in November, 1916.

1917. A bill was passed by the legislature amending the Reclamation Board Act, but the same was vetoed by the Governor. This bill originally contained several recommendations of the Water Problems Conference, but was fatally altered and added to as a result of requests from associations and landowners.

The United States Congress finally adopted the California Debris Commission plan for a general flood control scheme in the Sacramento Valley, committing the government to an expenditure therefor of $5,600,000—with a maximum appropriation of $1,000,000 a year—to be used only for the enlarging of the lower Sacramento River below Cache Slough, for the construction of weirs, and for the improvement and rectification of river channels, none of this amount to be spent for rights of way, all of which must be deeded to the federal government without cost to it.

CHAPTER II.

PURPOSE AND DESCRIPTION OF THE SACRAMENTO AND SAN JOAQUIN VALLEYS FLOOD CONTROL PROJECT.

TREMENDOUS VOLUME SACRAMENTO RIVER FLOODS.

The Reclamation Board was created and exists for the purpose of establishing and realizing a permanent and sufficient flood control scheme for the entire Sacramento and San Joaquin valleys, for the protection of life, property and navigation.

The maximum floods of the Sacramento River are the greatest in the United States, except those of the Mississippi, Ohio and Columbia rivers, and in proportion to the territory drained are from four to fifteen times as great as those of the above-named rivers.

The volume of water in an extreme flood of the Sacramento River is from four to eight times greater than the capacity of its channel in different sections. This incapacity has been increased by the debris deposits and settlements from hydraulic mining. The same flood conditions obtain in the San Joaquin River (except mining debris), but to a less degree.

The construction of reclamation levees in the basins has increased the flood planes, and their locations without reference to a comprehensive relief scheme would ultimately result in serious damage and loss at each time of high water of a volume greater than the meager capacities of the existing channels.

SACRAMENTO VALLEY FLOOD CONTROL SCHEME.

The general scheme of the California Debris Commission, recommended for the Sacramento Valley in 1910 after five years of careful surveys and investigations, contemplated the enlargement of river channels by strong levees of practical heights on their banks, for the purpose of utilizing natural waterways as much as possible and for improving navigation, and provided for the carrying off of all surplus flood waters to sea level through the natural low basins, this surplus to be delivered into the basins by means of large concrete weirs or openings in the river levees. (See map of Sacramento Valley Flood Control Project in Appendix.)

The later investigations of engineers of federal and state commissions have resulted only in detailing and modifying slightly this general scheme for practical solution. This consisted principally in establishing the best locations and necessary widths of the large by-passes

through the basins. These by-passes vary from one to fourteen thousand feet in width with levees of practical height.

The Sacramento Flood Control Project as now adopted includes levees along the banks of the Sacramento River from its mouth to Chico Creek, of Sutter, Miner and Steamboat sloughs throughout their entire lengths, of the American River from its mouth to Brighton, of the Feather River from its mouth to Hamilton Bend, of the Bear River from its mouth to Wheatland, and of the Yuba River from its mouth to Hammonton. It also includes leveed by-passes throughout the Butte, Sutter and Yolo basins from a point about ten miles above Colusa to a point near Rio Vista, as well as the Tisdale and Sacramento cross by-passes. The Knights Landing Ridge Cut, connecting the Colusa and Yolo basins west of the Sacramento River, is also a part of the project.

STATE'S RESPONSIBILITY OF SUPERVISION AND EXECUTION.

It is the province of the Reclamation Board to see that no levees, structures or obstructions are permitted which will in any way interfere with the construction or efficiency of the adopted flood control scheme, and also, where a public necessity exists, to actually undertake the construction of portions of the flood control plan, assessing therefor the lands benefited by said construction.

FEDERAL GOVERNMENT'S INTEREST IN FLOOD CONTROL.

The adopted flood control scheme for the Sacramento Valley also includes the very material enlargement of the lower 15 miles of the Sacramento River in order to carry all flood waters from the by-passes and upper channels to Suisun Bay. The present lower river width of a few hundred feet is to be widened to about one-half mile, and the depth is to be increased to about 25 feet at normal low-tide stages.

The estimate of 1910 anticipated the expenditure of $33,000,000 to realize the entire flood control scheme, and suggested one-third as the federal government's share in the same from a navigation standpoint. Congress, however, in adopting this scheme in 1917, decided that the government's interest should be limited to one-half share of the cost of the enlargement of the lower river, of the construction of concrete weirs in river levees at the openings into the by-passes, and of the rectification and improvement of the Sacramento River channel. The amount still needed to complete this work was estimated at $11,200,000, hence the government committed itself to a further expenditure of $5,600,000, to be equaled by the state appropriations.

The working plan, as now operative, is as follows: The construction of the four large concrete weirs, the enlargement of the Sacramento

River channel below Cache Slough, and the Sacramento River rectification and improvement are under the direct supervision of the California Debris Commission and are paid for by equal federal and state appropriations totaling $11,200,000, to be spent at a rate not exceeding $2,000,000 per annum. The balance of the flood control works are to be built under the supervision and with the approval of the Reclamation Board, and, where public necessity demands, by the Reclamation Board itself, and are to be paid for by the owners of lands benefited, assessments being levied by reclamation districts or by the Sacramento and San Joaquin Drainage District.

SAN JOAQUIN VALLEY FLOOD CONTROL.

The San Joaquin Flood Control Project has not yet been adopted, but the federal and state engineering departments have made preliminary surveys and investigations looking toward a by-pass system in that valley.

CHAPTER III.

ORGANIZATION AND DEVELOPMENT OF THE RECLAMATION BOARD.

ORGANIZATION AND RULES OF PROCEDURE.

The Reclamation Board Act of 1911 became effective March 23, 1912, and the Governor appointed as members V. S. McClatchy of Sacramento, Peter Cook of Rio Vista and W. T. Ellis of Marysville. The board effected its organization May 25, 1912, by electing Mr. McClatchy as president and Mr. Ellis as secretary.

Rules of procedure for hearings on reclamation applications were adopted and monthly and special meetings were held. The legal and engineering advisers were the State Attorney General and State Engineer. No salaries, clerical assistance, office or traveling expenses were provided for by the act and the board met in borrowed rooms in the State Capitol.

ENLARGEMENT AND REORGANIZATION.

Under the amended act, effective August 11, 1913, the Governor appointed as the four additional members, A. G. Folger of Sacramento, M. C. Zumwalt of Tulare, and L. H. Frankenheimer and G. A. Atherton of Stockton. The board reorganized August 19, 1913, with Mr. McClatchy as president, Mr. Folger as vice-president and Mr. Ellis as secretary.

The members were paid a per diem rate (not to exceed $1,000 each per annum) plus expenses for attendance upon meetings. Offices were opened in the Nicolaus Building, Sacramento, in September, 1913, and moved to the Forum Building in January, 1915, where they are at the present time. The board engaged the legal services of C. H. Oatman and the engineering services of E. A. Bailey, an assistant in the State Engineering Department, at fixed annual salaries.

RESIGNATIONS AND CHANGES.

Mr. McClatchy rendered invaluable services to the Reclamation Board and the state, not only by his activities as president of the board in charge of its administrative affairs, but also by his frequent appearances before Congressional Committees in Washington in connection with flood control matters in the Sacramento Valley. This required a great deal of his time which he felt he could no longer spare for this work after the adoption of the Sacramento Valley Flood Control plan

by Congress in March, 1917; hence his resignation of July 31, 1917, became effective October 1, 1917, and the Governor appointed A. B. Fletcher of Sacramento (who is also chief engineer of the California State Highway Commission) to fill the vacancy. Mr. Fletcher was immediately elected president of the board.

Mr. Frankenheimer resigned October 15, 1917, because the press of his personal affairs did not permit him to give the time and thought to Reclamation Board matters which he deemed the importance of this work demanded.

CONSTRUCTION AND CO-OPERATIVE POLICIES.

Actual construction work was undertaken by plans and assessments adopted during the latter part of 1917, and on January 1, 1918, Melville Dozier, Jr., of San Francisco, was appointed general manager and chief engineer of the Reclamation Board.

From the beginning, the board has kept in close touch and co-operation with the California Debris Commission, and has obtained its suggestions and recommendations upon all reclamation applications and flood control projects and problems considered by it.

CHAPTER IV.

ACCOMPLISHMENTS OF THE RECLAMATION BOARD.

HEARINGS OF APPLICATIONS FOR RECLAMATION.

The Reclamation Board has held hearings and passed upon 109 applications for approval of plans for reclamation and for construction of pumping plants, bridges, structures, etc. Of the above applications 52 have been presented since the last report of April, 1916. This function of the board is frequently termed its police power.

SURVEYS AND INVESTIGATIONS.

The board has had surveys made of all river channels and by-pass areas within the Sacramento Valley Project, and to some extent within the San Joaquin Valley Project. In the former it has established the locations and sizes of a large proportion of the levees, including those of the Sacramento River as far north as Tisdale Weir and Colusa, of the Feather River to Nelson Bend, of the Bear River to Wheatland, and of the entire Yolo, Sacramento, Sutter, Tisdale and Butte by-passes. This branch of the board's work has to do with the development and modification of the adopted general flood control plan.

CONSTRUCTION WORK.

In addition to the above powers and duties of the board, it is authorized and instructed to take charge of and actually to perform or to contract construction work, where public necessity demands, upon portions of the flood control plan. In compliance with this requirement the board has undertaken construction work on four projects, viz—Sacramento By-pass, Fremont Weir Site, Freeport Levee and Sutter-Butte By-pass.

APPROPRIATIONS AND ASSESSMENTS.

The total of state appropriations for Reclamation Board expenses, investigations and operations has amounted to $110,000, of which the sum of $50,000 has been returned to the State Treasurer and thereafter used by the board as a revolving fund. For the carrying on of its work and the execution of projects under its direction, the board has levied six assessments, the first for general administrative and engineering expenses levied upon the entire Sacramento and San Joaquin Drainage District, and the remaining five for special project construction work levied upon lands benefited thereby.

The amounts and status of these assessments are as follows:

RECLAMATION BOARD ASSESSMENTS.

No.	Project	Total amount	When levied	When called	Status Dec. 31, 1918	
					Collected	Uncollected
1	Administration	$250,000	June, 1914	June, 1915 Oct., 1917	$186,356	$63,644
2	Sacramento River Outlet	1,500,000	Aug., 1914 Dec., 1918			1,500,000
3	Sacramento By-pass	1,095,000	Aug., 1914 Feb., 1916	Mar., 1918	1,055,461	39,539
4	Fremont Weir Site	219,000	Aug., 1915 May, 1916	Dec., 1918		219,000
5	Freeport Levee	58,163	Jan., 1916	April, 1917	50,211	7,592
6	Sutter-Butte By-pass	10,624,522	Nov., 1917 Dec., 1918			10,624,522
	Totals	$13,746,685			$1,292,028	$12,454,657

The assessment and construction work undertaken and accomplished by the board is as follows:

GENERAL ADMINISTRATIVE ASSESSMENT No. 1.

General Assessment No. 1 for $250,000 was levied in June, 1914, against the entire million and three-quarters acres included within the Sacramento and San Joaquin Drainage District, for the administrative and engineering expenses of the board for a term of years, and for the purpose of returning to the state treasury $50,000 of a former appropriation in accordance with the requirement of the Reclamation Board Act. Sixty per cent of this assessment was called in June, 1915, and the remaining 40 per cent in October, 1917.

Most of the amount still uncollected from this assessment was withheld pending the final decision of a test suit brought by San Joaquin Valley interests which objected to being included in a flood control scheme. The decision of the Superior Court has upheld the validity of the act and the assessment, but the Supreme Court has not yet rendered an opinion. The three assessors appointed to spread this assessment were A. E. Chandler of Berkeley, M. W. Enderlein of Hanford and A. Brown of Berkeley.

SACRAMENTO RIVER OUTLET ASSESSMENT No. 2.

Sacramento River Outlet Assessment No. 2 for $367,000 was levied in August, 1914, for the purpose of purchasing rights of way and easements in connection with the enlargement of the lower Sacramento

River by the federal government, and of reimbursing those state, municipal and private interests which had already advanced moneys with which to purchase lands in order to permit the work to progress without delay. The same three assessors were appointed as for Assessment No. 1.

This assessment was never called, because, as the suction dredge work progressed, it became evident that the federal government would need much more land for spoil or waste material than at first anticipated, due to the nature of the lands which make it impossible to place much material on any one spot without causing serious settlement. The board now, after securing from the California Debris Commission the maximum limits of lands to be needed, has levied in December, 1918, an assessment of $1,500,000 for the purpose of purchasing lands needed by the federal government in the prosecution of this work.

SACRAMENTO BY-PASS ASSESSMENT No. 3.

Sacramento By-pass Assessment No. 3, amounting to $900,000, was levied in August, 1914, and the same three assessors appointed as for Assessment No. 1, but this assessment was later canceled and an enlarged assessment amounting to $1,095,000 levied in February, 1916, to cover changes necessitated by the weir plans finally approved by the federal engineers. The assessors who made the final distribution were F. C. Herrmann and B. A. Etcheverry of Berkeley, and M. W. Enderlein of Hanford.

The Sacramento By-pass is a cross valley by-pass connecting the Sacramento River, near the mouth of the American River just north of the city of Sacramento, with the Yolo By-pass, which latter extends from the mouth of the Feather River to the lower Sacramento River near Rio Vista. The Sacramento By-pass is approximately one-third of a mile wide and one and one-half miles long, and crosses through Reclamation Districts No. 537 and No. 785. The weir in the river levee is a heavy concrete structure about 2,000 feet long, and carries overhead, in concrete bridge construction, the Sacramento-Woodland Electric Railway and the county road. The by-pass itself is paralleled on each side with a large heavy levee equal in size to the river and by-pass levees.

The necessity for this by-pass is understood when it is realized that the volume of the largest flood known in the American River was approximately twice the capacity of the present leveed channel of the Sacramento River opposite the city of Sacramento. Fearing the danger of an American River flood, the city of Sacramento urged the early construction of the Sacramento By-pass, and advanced temporarily the

cash needed to purchase by-pass right of way and to construct the concrete weir with road and railroad superstructures. The city of Sacramento has now been reimbursed for its advances in behalf of the Sacramento and San Joaquin Drainage District.

The easterly 2,000 feet of the Sacramento By-pass levees (those portions near the Sacramento River) are now being completed by means of suction dredge excavation from the bed of the river. The balance of the levees have been built by clamshell dredge construction. The suction dredge was employed in order to eliminate undesirable borrow pits or excavations near the levees in the vicinity of the river or weir, where the current may be considerable, due to slope of ground surface.

The weir construction has been entirely completed, and the levees, which have been under construction for a year and a half, have now been practically completed, although the clamshell dredge is still at work enlarging sections of levee.

The construction of the Sacramento By-pass is carried on by assessment and under the direction of the Reclamation Board, for it is a general flood control relief benefiting tremendous areas, and not confined in its advantages to any one reclamation district or community.

FREMONT WEIR SITE ASSESSMENT No. 4.

Fremont Weir Site Assessment No. 4, amounting to $180,000, was levied in August, 1915, but was canceled, enlarged and relevied in May, 1916, and distributed by Assessors Herrmann, Etcheverry and Enderlein. This final assessment, which amounts to $219,000, was ordered by the board for the purpose of purchasing land necessary for the Fremont Weir across the head of the Yolo By-pass (which is 8,000 feet wide at that point), and to permit of the clearing of the upper end of the Yolo By-pass of all brush, timber and old existing cross-levees, for the relief and safety of the river and reclamation levees.

This is a part of the adopted flood control plan for the Sacramento Valley and its realization will be a benefit to lands in several counties and many reclamation districts. Hence the assessment for and direction of the handling of the same became a duty of the Reclamation Board.

Approximately 2,300 acres of land have been secured and the clearing of the brush and most objectionable obstacles has been practically accomplished by the end of the present year, 1918. The California Debris Commission has begun investigations, surveys and foundation tests for the construction of the large Fremont Weir at the head of the Yolo By-pass.

The expenditures to date have been in warrants issued by the State Controller and the Reclamation Board made the call for the collection of the assessment in December, 1918.

FREEPORT LEVEE ASSESSMENT No. 5.

Freeport Levee Assessment No. 5 was levied in January, 1916, and was spread by the same three assessors who handled assessments No. 3 and No. 4. It amounted to $58,163.70 and the call for collection was issued by the Reclamation Board in April, 1917.

The work contemplated by this assessment called for the protection or revetment, with concrete facing and sheet piling toe protection, of a portion of the east levee of the Sacramento River just south of the town of Freeport, Sacramento County. The levee at this point is on the outside of a sharp bend in the river, which has always suffered a damaging attack by the current of the stream. A break at this point would damage much land in Sacramento and San Joaquin counties.

This particular section of levee is not a part of any reclamation or legal district, and its repair or temporary protection in the past has been cared for by the State Engineering Department, county supervisors or private subscriptions. A public necessity evidently existed on account of the conditions related above; hence it was the established duty of the Reclamation Board to levy an assessment and undertake the work required.

The work was completed in January, 1918, by the finishing of about one-half mile of concrete levee facing with timber sheet-piling toe wall. There is still a small amount to be collected, to redeem the remaining outstanding warrants, and this is expected soon after the rendering of a favorable decision by the Superior Court now considering testimony in a suit brought by a few of the objectors to the payment of said assessment.

SUTTER-BUTTE BY-PASS ASSESSMENT No. 6.

Sutter-Butte By-pass Assessment No. 6 was levied by the Reclamation Board in November, 1917, and amounted to $14,993,190, but in December, 1918, it was revised, amended, reduced and relevied for a total amount of $10,624,552.25, and is now being distributed by the last-named assessors, viz: Messrs. Herrmann, Etcheverry and Enderlein.

This project is for the relief of the Sacramento River, and includes complete and continuous by-pass systems from the Moulton Weir site, about ten miles north of Colusa, through the Butte and Sutter basins to the Fremont Weir site, at the junction of the Feather and Sacramento rivers, and also includes the Tisdale Cross By-pass, Butte Creek, Cherokee Canal, Butte Slough, Wadsworth Canal and other intercepting canal levees and excavations, as well as resulting drainage systems.

The construction of the concrete weirs at Moulton and Tisdale devolve upon the federal government, but the assessment, as a complete project and an integral part of the flood control plan, provides for the cost of

weir sites, by-pass easements, levee rights of way, total levee and drainage canal construction, complete clearing of obstructions from by-pass areas, etc.

All those portions of the project which are parts of the plans of reclamation districts will be constructed by such districts, although their ultimate costs are included in this total assessment. Those portions of the project, however, which are not covered by the plans of any approved, established or legalized reclamation district, but which must be built at an early date for the protection and safety of various districts, communities or individuals, are being constructed under the direction of the Reclamation Board. This latter includes the purchase of all weir sites and by-pass easements, the clearing of all weir sites and by-pass areas, the construction of the east levee of the Sutter By-pass, the excavation of the Wadsworth and intercepting canals, the providing for partial drainage east of the Sutter By-pass, and the purchase of rights of way for levees and canals so constructed.

The actual construction work upon portions of this project has been under way for a considerable time. Reclamation District No. 1500 has largely constructed the west levee of the Sutter By-pass from its southern or lower end to the Tisdale By-pass, and also the entire south levee of the Tisdale By-pass, has cleared the latter of all obstructing brush and timber and has reduced and removed some of the old existing levees across the Sutter By-pass opposite old Levee District No. 1. That district has also constructed about three miles of the east levee of the Sutter By-pass, being that portion through old Levee District No. 1. This was done in compliance with a requirement imposed in section 1 of the legislative act, approved April 30, 1913, creating Reclamation District No. 1500. Also Reclamation District No. 70 and Sacramento River West Side Levee District have together cleared a portion of the Butte Slough By-pass, and Reclamation District No. 70 has constructed the west levee of the Butte Slough By-pass.

The actual construction work undertaken by the Reclamation Board to this date, consists of the clearing of the lower Sutter By-pass, the construction of the east levee of the Sutter By-pass south of Wadsworth Canal, and the excavation of the Wadsworth and intercepting canals, with provision for drainage outlet for territory east of the Sutter By-pass.

The clearing of the lower Sutter By-pass included the removal and destruction of exceedingly dense brush and timber from about 3,500 acres, and the elimination of about half a dozen old cross levees and slough embankments. The brush and timber clearing has been practically completed, and the three most objectionable old levee obstructions have also been removed. This work has required six contracting camps

employing at times a total of five hundred men and two hundred head of stock per day. This clearing work was one of the most necessary and immediately urgent parts of the entire project for the rapid disposal of flood waters and for the safety of reclamation levees and districts now under intensive cultivation.

For several months the Reclamation Board has had four large clamshell dredges and one dragline excavator at work upon the east levee of the Sutter By-pass between the Feather River and Wadsworth Canal. The ground is so hard and the hardpan so near the surface, along the line of this east levee, that it has been necessary to blast the ground throughout the entire distance. By March, 1919, the east levee of the Sutter By-pass should be continuous from the Feather River to a point about a mile above the Tisdale By-pass. This levee will not then be of full or completed cross section, but will be so nearly completed and of such formidable size as to offer decided protection for lands back of it.

At its northerly end this levee as now built connects with the northwest levee of old Levee District No. 1, which continues several miles northerly to the Marysville-Colusa Electric Railway. At the present time all gaps in the lower east levee between the dredges now at work are spanned by either the southwest levee of old Levee District No. 1, or the Southern Pacific railroad embankment.

The construction work undertaken by the Reclamation Board on the east levee of the Sutter By-pass is not only a part of its duty under the requirements of the Reclamation Board Act, but is also in direct compliance with the request of the last state legislature as expressed in a joint resolution passed near the close of the session.

This work is being paid for in warrants issued by the State Controller against Assessment No. 6, which during 1918 were purchased at par by the Sutter Basin Company in compliance with the terms of agreements between the Reclamation Board and the Sutter Basin Company executed January 22, and March 25, 1918, whereby the latter, at an interest loss, agreed to purchase these warrants in order to permit the board to commence, prior to the collection of the assessment, the construction work so necessary for the protection of Sutter County lands east of the Sutter By-pass. (See Appendix for copies of said two agreements.) (Also see Appendix for Financial Statements reflecting status of Reclamation Board accounts on December 31, 1918.)

CHAPTER V.

FLOOD CONTROL WORK OF THE CALIFORNIA DEBRIS COMMISSION.

CREATION AND PRELIMINARY WORK.

The California Debris Commission, which was created by act of Congress in 1893 and consists of three officers of the Corps of Engineers of the United States Army, is the government's agent in charge of flood control and river improvement matters in the Sacramento and San Joaquin valleys.

It was the report of this commission, completed in 1910 after several years of investigations and surveys, which formed the plan or basis of the present comprehensive flood control scheme for the Sacramento Valley, upon which the Reclamation Board is working, and which was adopted by the state legislature in 1911 and by the United States Congress in 1917.

SUPERVISION AND CONSTRUCTION RESPONSIBILITIES.

In the construction of the works of the Sacramento Valley Flood Control Project, the California Debris Commission has direct supervision of the plans, operations and disbursements of those portions for which the federal government appropriates joint funds in conjunction with the state legislature.

From 1910 to 1916 this work was confined to the so-called Minor Project, that is, to the construction and operation of two hydraulic dredges for the removal of debris deposits from the river system for the improving of navigation. The ultimate plan calls for the widening of the river, from the mouth of Cache Slough to Collinsville, from its present width of a few hundred feet to a width of about half a mile, and the increasing of its depth to about twenty-five feet at normal low water stages.

FEDERAL AND STATE APPROPRIATIONS.

In 1917 Congress adopted the Major Project—the entire Sacramento Valley Flood Control scheme which includes the Minor Project—and committed itself to a further expenditure of $5,600,000 as its share of the remaining total cost, on condition that the state make equal appropriations with the government, and also with the explicit condition that the federal government's annual appropriation shall not exceed $1,000,000. This figure was one-half of the estimated cost of $11,200,000 necessary to complete the enlargement of the lower river, to construct

the four large concrete weirs (Moulton, Tisdale, Fremont and Sacramento), and to make several changes in the course of the upper Sacramento River by means of "cut-offs."

Up to the present time, December 31, 1918, the federal government and the state have each appropriated $1,350,000 for flood control work under the direction and disbursement of the California Debris Commission, the last $670,000 from the government being a portion of the above-mentioned $5,600,000. In other words, a total of $2,700,000 has been turned over to the California Debris Commission, by both nation and state, and it is estimated that it will require $9,860,000 more to complete the general public's share of the cost of the plan. None of the above appropriations can be expended for rights of way, but must be spent for actual construction work.

The following resolution was adopted by the Reclamation Board at its meeting of December 27, 1918, recommending an appropriation of $800,000 by the incoming legislature as the state's share of the amount needed for continuing the work performed under the direction of the California Debris Commission until August, 1921:

THAT WHEREAS, The United States government, by an act approved March 1, 1917, adopted the Sacramento Valley Flood Control plans as recommended by the California Debris Commission in 1910 and adopted by the state legislature in 1911;

AND WHEREAS, Said federal government did by said act of March 1, 1917, commit itself to a total appropriation and expenditure of $5,600,000 (with a maximum annual expenditure of $1,000,000) as its share of the costs of those portions of the adopted plan which provide for the rectification and enlargement of river channels and the construction of weirs; provided, that said appropriations be not used or expended until the state of California shall have given satisfactory assurances that it will contribute annually for such work, sums equal to those expended by the federal government, and that such equal contributions will continue annually until the full equal share of the cost of such work shall have been contributed;

AND WHEREAS, The state legislature has made appropriations for its share of this work in 1913, 1915 and 1917, all of which have been met or equaled by government appropriations;

AND WHEREAS, The California Debris Commission has estimated (and so informed the Reclamation Board and the State Board of Control) that in order to continue this work as planned and outlined, and by it deemed best and advisable, it will need appropriations totaling $1,600,000, in addition to the funds still on hand, to operate continuously until August, 1921 (being the limit of time which the incoming legislature of 1919 must consider in making appropriations), and hence recommends that the federal government and the state legislature each provide not less than $800,000 for use and expenditure up to August, 1921;

AND WHEREAS, Said Reclamation Board realizes that the construction work of private reclamation districts in the central and

upper regions of the valley have developed and completed such large portions of the Major Project of the Sacramento Valley Flood Control scheme, that the rapid prosecution of the work of enlarging the lower Sacramento River is not only advisable, but necessary for the adequate protection of properties and reclaimed lands in the Delta region;

Now, Therefore, The Reclamation Board of California does hereby approve of the above estimate and request for joint appropriations, and does hereby earnestly recommend that the incoming state legislature of 1919 shall appropriate not less than $800,000 as the state's share of expenditures to be made under the direction of the California Debris Commission in continuing and carrying on the enlargement of the lower Sacramento River up to August, 1921, the same to be equaled by government appropriations prior to that time.

CONSTRUCTION ACCOMPLISHED IN SACRAMENTO VALLEY.

The actual construction work accomplished to date by the California Debris Commission includes, in addition to the construction at a cost of $400,000 of two large suction dredges, a continuous slight channel enlargement of the Sacramento River from Rio Vista to Collinsville, with a very considerable enlargement at the most vital points, such as the cut-offs through Horseshoe Bend, Baker Point and at the lower end of Sherman Island. In addition to work upon the Minor Project, this commission has made investigations and surveys for the Fremont Weir, completed a river cut-off at Collins Eddy, and is now at work upon a cut-off connecting Wild Irishman and Kinney bends.

With its two suction dredges and hired clamshell dredges, the California Debris Commission has excavated to July 1, 1918, over 31,000,000 cubic yards of material in Sacramento Flood Control Work, in addition to performing about eighteen dredge months' work in emergency matters at Mare Island Navy Yard, Liberty Shipbuilding Plant, Sacramento By-pass, and Southern Pacific Shops at Sacramento.

SAN JOAQUIN VALLEY INVESTIGATIONS.

Surveys and some investigations have been made by the California Debris Commission in the San Joaquin Valley in anticipation of the recommendation of a comprehensive flood control scheme for the San Joaquin River and its tributaries.

MAINTENANCE OF NAVIGATION.

None of the above includes in any way the purely maintenance work of the California Debris Commission in the construction of wing dams, or the removal of drift, snags or deposit from the navigable streams in the two valleys. (See Appendix for progress map showing present status of California Debris Commission Work in the lower Sacramento River.)

CHAPTER VI.

RECENT WORK PERFORMED BY THE RECLAMATION DISTRICTS.

PLANS APPROVED BY RECLAMATION BOARD.

During the life of the Reclamation Board, that is since May, 1912, many thousands of acres of land have been reclaimed in the Sacramento and San Joaquin valleys by private capital, usually under the jurisdiction of a reclamation district. Plans for all this work have been passed upon by the Reclamation Board, which has required that they conform to the general flood control schemes as modified and perfected.

ACREAGES RECLAIMED AND LEVEES BUILT BY SOME OF THE LARGEST DISTRICTS.

The following list gives the acreages reclaimed and the lengths of levees built by several of the largest reclamation districts which have either completed or commenced reclamation construction since the adoption by the state of the Sacramento Valley Flood Control plan:

Reclamation district	Acres	Miles of levees
Sacramento River West Side Levee District	107,000	49.80
Reclamation District No. 1500	62,735	59.70
Reclamation District No. 1000	53,040	41.28
Reclamation District No. 1001	31,420	38.40
Reclamation District No. 1600	6,150	17.30
Reclamation District No. 900	22,555	25.64
Reclamation District No. 900	10,400	18.25
Reclamation District No. 1002	5,830	13.90
Several delta islands	20,915	79.43
Totals	328,345	350.70

Reclamation and construction work during the period of the Great War has been considerably reduced, yet private interests have spent about $2,000,000 upon reclamation works during the fiscal year ending June 30, 1918. This was spent principally by nine districts as hereinafter given in some detail.

SACRAMENTO RIVER WEST SIDE LEVEE DISTRICT.

The Sacramento River West Side Levee District has completed the enlargement of the west bank of the Sacramento River from Knights Landing upstream to Colusa—a distance of about fifty-five miles. This completes a continuous levee on the west bank of the Sacramento River from its mouth to Colusa—about one hundred and fifty miles—although much of it will need slight raising and enlargement to bring it to the established height and section. The remaining portion, which is not

sufficiently protected by a modern levee, extends from Colusa to [illegible]ny Creek, a distance of about forty-seven miles.

KNIGHTS LANDING DRAINAGE DISTRICT.

Knights Landing Drainage District has altered the alignment of several miles of the back levee of Reclamation District No. 787 for the purpose of improving the drainage, and rapid outlet into the Knights Landing Ridge Cut, of Coast Range waters reaching the Colusa Basin.

RECLAMATION DISTRICT No. 70.

Reclamation District No. 70 and the Sacramento River West Side Levee District together have cleared the brush and timber from the easterly 2,000 feet of the Butte Slough By-pass—that portion against the Marysville Buttes—and have reduced and eliminated most of the famous Parks Dam, or levee, which was built nearly a half century ago between Butte and Sutter basins.

RECLAMATION DISTRICT No. 1500.

Reclamation District No. 1500 has about completed a continuous levee system around its entire district, and much of the river levee has attained practically its final grade and section. This includes the east levee of the Sacramento River from the Fremont Weir (near the mouth of the Feather River) to the Tisdale Weir. Those portions of the east levee of the Sacramento River still to be built, in order to give it a continuous levee, are the three or four miles between Reclamation Districts No. 1500 and No. 70, and the fifty-seven miles between Butte Slough and Chico Creek. The north levee of Reclamation District No. 1500 forms the south levee of the Tisdale By-pass, and its east levee is also the west levee of the Sutter By-pass south of Tisdale By-pass.

RECLAMATION DISTRICT No. 1600.

Reclamation District No. 1600 has completed a continuous levee system around its lands. Its river levees have been brought up to the standard grade and section, and form the west or right levee of the Sacramento River from Elkhorn to the Fremont Weir, a distance of about ten miles. The west levee of this district is also the east levee of the most northern portion of the Yolo By-pass, and its construction also practically completed the continuity of the entire east levee of the Yolo By-pass from the mouth of Cache Slough, near Rio Vista, to the Fremont Weir, near the mouth of the Feather River.

RECLAMATION DISTRICT No. 999.

Reclamation District No. 999 has practically completed its levees, although more work must be done on its back and slough levees to bring them up to required section and grade. Its river levee is fully completed, but it is very short, extending along the west bank of the Sacramento River from Clarksburg to the Lisbon District No. 307. The west levee of District No. 999 forms the east levee of the Yolo By-pass from District No. 900, a point about five miles south of Sacramento, southerly to Ryer Island, a distance of about fifteen miles.

RECLAMATION DISTRICTS Nos. 744, 551 and 3.

Reclamation Districts No. 744, No. 551, and No. 3 (Grand Island) have completed to final grade and section large portions of their river levees. These are old and well established levees, but were fully completed recently to permit the construction, on their crowns, of the Sacramento County Concrete Highway, connecting Sacramento and Rio Vista. Districts No. 744 and No. 551 are upon the east bank of the Sacramento River between Freeport and Walnut Grove, and District No. 3 is on the west bank between Courtland and Rio Vista.

TIDAL AND DELTA REGION RECLAMATIONS.

In addition to the above, considerable construction work has been performed during the past two years upon tidal reclamations in the lower Yolo Basin by the Liberty Farms and the Holland Land Companies, and upon reclamations in the San Joaquin Delta region by the Bouldin Island and the California Delta Farms Companies. Summer flood reclamations have been built in the San Joaquin Valley, including particularly the Elliott ranch at the confluence of the San Joaquin and Stanislaus rivers.

CONAWAY RANCH.

A large reclamation district is being planned for the west side of the Yolo By-pass, whose east levee when constructed will form the west levee of the By-pass from a point near Cache Creek, just below the mouth of the Knights Landing Ridge Cut, to a point near the Southern Pacific railroad which connects Sacramento and Davis. Actual construction of this levee may be commenced within a few months. This proposed district is now known as the Conaway Ranch.

The above brief statements have mentioned only the levee construction and have not attempted to outline the large amount of work performed upon the drainage works and systems of the above and other districts.

DETAIL OF LEVEES FORMING PORTIONS OF SACRAMENTO VALLEY FLOOD CONTROL PLAN.

The tables given below show the lengths of levees of reclamation districts and private or municipal ownerships which form the river and by-pass levee systems of the Sacramento Valley Flood Control Project.

MILEAGE OF LEVEES OF THE SACRAMENTO VALLEY FLOOD CONTROL SYSTEM.

River Levees.

Section	1 Completed to approved grade	2 Almost up to standard	3 In course of construction	4 Not yet constructed
Left bank— Sacramento River.				
Chico Creek to Glenn County line				16.95
Glenn County line to Butte Slough		32.48		
District No. 70		15.55		
District No. 1200		2.90		
D'strict No. 1500	35.31			
District No. 1001		.95		
D'strict No. 1000	17.60			
District No. 1		.43		
Sacramento City	3.66			
District No. 535		3.40		
D'strict No. 673		5.56		
District No. 824 to District No. 913, inclusive	4.56	5.94		
District No. 755 and District No. 551	8.67			
District No. 367 to Brannan Island, inclusive		13.96		
Right bank—				
St. Johns to 2.7 miles north of Jacinto				7.12
2.7 miles north of Jacinto to Colusa		32.91		
Colusa to Knights Landing	49.80			
Knights Landing to Fremont Weir		5.17		.60
District No. 1600	10.61			
Districts No. 827, No. 785 and No. 537	8.02			
District No. 811 and Broderick	.39	2.88		
District No. 900	8.13			
D'stricts No. 765 and No. 367		8.20		
District No. 900		1.24		
Merritt Island		7.70		
Sutter Island		1.56		
Grand Island	17.32			
Steamboat Slough.				
Sutter Island				4.16
Ryer Island		6.67		
Grand Island	11.00			
Cache Slough to Collinsville.				
North side		10.45		
South side	2.15	3.82		7.10
Feather River.				
Right bank—				
Hamilton Bend to north line Drainage District No. 1, Butte County				7.77
Drainage District No. 1, north line to Yuba City		18.26		
Yuba City to Nelson Bend		10.41		
Left bank—				
D'strict No. 10		14.95		
City of Marysville	1.84			
District No. 784		4.37		9.28
District No. 1001		*12.12		
Yuba River.				
South levee		7.43		
North levee	9.01			
Bear River.				
All levees		26.62		
American River.				
North levee—				
District No. 1400	2.64			
Western Pacific Railroad to high land				6.00
South levee—				
District No. 1		2.21		
District No. 1 to Meister District				0.75
Meister District		1.85		
River totals	190.71	268.96		59.73

Total river levee, 519.42 miles.

*Includes 7.3 miles of levee from Nelson Bend to mouth of Feather River, which might be considered as Sutte By-pass levee.

MILEAGE OF LEVEES OF THE SACRAMENTO VALLEY FLOOD CONTROL SYSTEM—Concluded.

By-pass Levees.

Section	1 Completed to approved grade	2 Almost up to standard	3 In course of construction	4 Not yet constructed
Yolo By-pass.				
West levee				42.40
District No. 1600		6.25		
District No. 827		2.93		
District No. 785		3.41		
District No. 785 to District No. 900				1.45
District No. 900		4.67		
District No. 909		15.46		
Ryer Island	9.47			
Sutter By-pass.				
West levee—				
District No. 70		.77		
District No. 1600				9.41
District No. 1500		19.55		
East levee—				
Northern Electric Railway to District No. 1 levee			8.55	4.11
Through Levee District No. 1		3.14		
Levee District No. 1 to Nelson Slough			5.77	
Butte By-pass.				
All levees				24.00
Butte Slough By-pass.				
All levees		6.95		
Tisdale By-pass.				
North levee				4.35
District No. 1500			4.86	
Sacramento By-pass.				
All levees			3.67	
Knights Landing Ridge Cut.				
Both sides	12.55			
By-pass totals	22.02	63.12	22.85	85.72

Total by-pass levees, 193.71 miles.

CHAPTER VII.

RECORD OF WORK OF ENGINEERING DEPARTMENT OF RECLAMATION BOARD.

FIELD SURVEYS, INVESTIGATIONS AND STUDIES IN SACRAMENTO VALLEY.

The Sacramento Valley Flood Control scheme of the California Debris Commission, as recommended to Congress in 1911 by the Secretary of War, was essentially a general skeleton plan or foundation to serve as a basis for the development of each portion or project. This necessitated an immense amount of detail survey, investigation and study of flood history and conditions over an area of more than a million acres, and has required a considerable portion of the time and personnel of the engineering department of the Reclamation Board from the beginning.

The preliminary field work in this connection has included extensive surveys in the Butte, Sutter and Yolo basins, and along the Sacramento, American, Feather and Bear rivers, covering a territory reaching from Chico Creek to Suisun Bay. In addition to relative elevations, channel sections, and usual mathematical data, this field work has included the obtaining of flood records, soil surveys, physical and economic conditions and other information necessary for complete consideration of relative and best locations and sizes for river and by-pass channels.

OFFICE CALCULATIONS, PLANS AND DESIGNS.

From detailed study of the above field records and data, the office force has determined the flood quantities for which the river and by-pass channels should be designed, and has made recommendations to the Board for the locations of the Butte, Sutter, Yolo, Tisdale and Sacramento by-passes, which constitute the continuous by-pass system from the upper Sacramento River overflow north of Colusa to the Delta region near Rio Vista. Also flood planes have been worked out for the various river and by-pass channels, and recommendations made for their widths and the elevations of the tops of their levees.

FIELD AND OFFICE STUDIES OF SAN JOAQUIN VALLEY.

No comprehensive flood control plan has yet been recommended for the San Joaquin Valley, although the engineering departments of the California Debris Commission, the Reclamation Board and the state

have performed considerable field work and made preliminary investigations and studies of both its winter and summer (melting snow) floods. The field engineering work of the Reclamation Board has included surveys of the San Joaquin Delta region, of the San Joaquin, Mokelumne, Calaveras, and Stanislaus rivers, and of the overflowed lands adjacent thereto.

The office study of the above field data has included an analysis of the greatest recorded San Joaquin Valley flood (that of 1911), the comparison of various plans and locations for a by-pass system in and near the Delta region, the computations of flood quantities for the design of flood control works for both summer and winter floods, and the establishing of flood planes for a suggested by-pass system for both summer and winter floods.

HYDROGRAPHIC DATA.

Hydrographic data has been secured during each flood season recording stream flows and heights in rivers and basins in both the Sacramento and San Joaquin valleys. The information and data thus obtained have been of tremendous value in checking determining factors and perfecting plans for flood control. Many gaging stations are now permanently established, and daily records during flood conditions taken by agents living near them.

REPORTS AND RECOMMENDATIONS.

The findings and recommendations of the engineering department have been filed in the office of the Reclamation Board in the form of about thirty written reports in detail, covering the preliminary and location surveys and studies of the general flood control schemes, with their modifications, alterations and improvements, in both valleys.

RECENT SURVEYS.

During the past year, 1918, the general field engineering work of the department has included detail surveys of the Feather River (and adjacent territory) from its mouth to Hamilton Bend, just below Oroville, and of the Sacramento River from Tisdale Weir to Chico Creek, for the purpose of preparing final plans and estimates for the execution and completion of the flood control projects along these rivers. Also considerable field work has been done on the ground location of portions of the levees of the Yolo By-pass, upon drainage surveys and investigations in Sutter County between the Feather River and the Sutter By-pass, and upon channel and basin surveys near the junction of the San Joaquin and Stanislaus rivers. The office force is now working on the

Feather and Sacramento rivers data with a view to preparing plans and estimates upon which the Reclamation Board can base future assessments for complete projects.

EXAMINATIONS OF RECLAMATION PLANS.

An important phase of the department is the examination in detail of the engineering features of all applications presented to the Reclamation Board, and the presentation of full written reports with recommendations at the hearings and considerations of these applications. This often necessitates special field work and investigations.

DIRECTION AND SUPERVISION OF CONSTRUCTION WORK.

In addition to the above, the engineering department has made surveys and prepared descriptions for all lands, rights of ways and easements purchased, has prepared all detail plans, estimates and contracts for all construction work undertaken by the Reclamation Board, and has laid out, directed and supervised the actual construction work itself, keeping the usual progress and cost records. The principal construction work to date consists of the Freeport Levee Revetment, the construction of the Sacramento By-pass and the construction of portions of the Sutter By-pass.

The Freeport Levee Revetment included clamshell dredge work, pile driving, concrete facing and house moving. This has been completed. The Sacramento By-pass includes levee construction and removal by clamshell and suction dredge, and the erection and installation of pumping plants, equipments and concrete discharges. This work is nearing completion. The Sutter By-pass work includes levee construction by clamshell dredges and dragline excavators, the removal of levees and obstacles with teams, small steam shovels and ditchers, and the clearing and destroying of immense areas of obstructing brush and timber by laborers, teams and small equipment. The dredge work has included continuous ground blasting, as well as the operation of electric and gas engine pumps for dredge excavation and flotation.

PARTICIPATION IN DETAIL OF ASSESSMENT WORK.

A very important part of the duties of the engineering department has been the preparation and maintenance of an assessment plant which is necessary for the spreading and distribution of assessments. This plant contains a map for each township in the Sacramento and San Joaquin Drainage District, containing nearly a million and three-quarters acres in fourteen counties, showing each individual ownership or property, with description, acreage, name of owner, etc. This plant or record is kept constantly up to date for all those portions of the district which may be affected by the assessments now levied or anticipated for projects or portions of the flood control scheme. This is facilitated by an

arrangement with county recorders, whereby they send each week to the engineering department a record of all land transfers within those portions of their counties included within the Sacramento and San Joaquin Drainage District.

The engineering department furnishes all detail assistance to the three assessors of the Reclamation Board in making soil surveys, crop surveys, collecting data, preparing maps for apportioning assessments, and making the multitude of calculations based upon factors established by the assessors, preparing descriptions, etc.

While the engineering department assists the assessors of the Reclamation Board in the details of their work, yet the assessors are not a part of the engineering department, and in their judgment and work of distributing the assessments are not guided or directed by any member or officer of the board. The problems encountered in spreading the assessments of the Sacramento and San Joaquin Drainage District are far more difficult, perplexing and numerous than those of an ordinary reclamation district, and the distributions of the Reclamation Board's assessments are objects of attack, not only by those landowners who are dissatisfied with their proportions of the distributions, but by those who oppose, or do not agree with the adopted flood control scheme, or its manner of execution or assessment.

Many of the apparently strong and most vehement objections in the past have been overcome, and often withdrawn, during the advertised hearings on assessment distributions (at which the Reclamation Board always sits as a Board of Equalization), when the landowners have become familiar with and understood the methods, principles and factors used by the assessors in arriving at an equitable and just distribution of the assessments.

ORGANIZATION OF DEPARTMENT.

From 1912 to 1917, inclusive, the engineering department was technically an adjunct of the State Engineering Department, although in practice it was entirely a part of the organization of the Reclamation Board. It was, during that time, under the direction of the Flood Control Engineer, who reported directly to the Reclamation Board, although he had been appointed by the State Engineer as his assistant and assigned to Reclamation Board work.

The State Engineer is engaged upon procuring data and information for his report to the Reclamation Board, for the purpose of perfecting the plans of the adopted general flood control project for the Sacramento Valley, and is also preparing a report upon plans for a general scheme for the San Joaquin Valley. He also advises the Reclamation Board in matters concerning the approval of plans for reclamation and such other matters as may affect the flood control projects.

Under the present organization which has obtained during 1918, the general manager of the Reclamation Board is also its chief engineer, and the title of Flood Control Engineer, so far as the Reclamation Board is concerned, has been abolished. For the sake of efficiency the field engineering forces have been divided into three branches, viz: construction, preliminary surveys and investigations, and assessors' assistants and field parties.

CHAPTER VIII.

BRIEF SUMMARY OF LITIGATION.

SUITS AGAINST GENERAL ASSESSMENT No. 1.

A large number of suits were commenced by landowners in different counties to annul General Assessment No. 1, levied upon nearly all lands in the Sacramento and San Joaquin Drainage District, for general administrative and engineering expenses and for repayment to the state, as required by law, of one-half of the appropriation of $100,000 made in 1913 for the use of the Reclamation Board.

The suit brought by Miller & Lux in Merced County was selected as a test case, and was tried before Judge Beasly of Santa Clara County (presiding at the request of the governor in this Merced County case), who rendered a Superior Court decision and judgment in favor of the validity of the assessment upon all points involved. An appeal to the Supreme Court is now pending.

The legal questions raised in the Miller & Lux case include practically all questions involved in the other suits, all of which have been allowed to rest under a general understanding that they will abide by the final decision in the Miller & Lux suit.

One of the most important questions involved, and decided favorably by the Superior Court, is the right of the Reclamation Board to levy an assessment for its general and miscellaneous expenses which do not pertain directly to the construction of any particular part or project of the general flood control plan or plans.

Of the total assessment of $250,000, about $25,000 was originally involved in the above suits, but a portion of it has since been paid and the suits thereon abandoned.

SUITS AGAINST SACRAMENTO BY-PASS ASSESSMENT No. 3.

A few suits were commenced by landowners to annul Sacramento By-pass Assessment No. 3 against their lands, upon the claim that, owing to local conditions, their lands will not be benefited by the Sacramento By-pass. These suits involve a comparatively small amount—a very inconsiderable proportion of the total assessment of $1,095,000—and trial of them has been delayed awaiting decision in similar suits against Assessment No. 5.

A suit was brought by G. W. Swanson, who owns land at the west end or mouth of the Sacramento By-pass to enjoin the opening and operation of the Sacramento By-pass, but the case has been settled and dismissed.

A similar suit was commenced in 1917 by the owners of the Conaway ranch, located on the west side of the Yolo Basin and By-pass, and northwest of the mouth of the Sacramento By-pass. This case has not been brought to trial and is still pending.

SUITS AGAINST FREEPORT LEVEE ASSESSMENT No. 5.

Also a few suits have been brought against Freeport Levee Assessment No. 5 by the same landowners who are contesting Assessment No. 3, and for similar reasons, viz: lack of benefit. These suits involve about $7,000 out of a total assessment of over $58,000. They have been brought to trial under Superior Judge Beasly, presiding for these suits in Sacramento County, but no decision has yet been rendered.

A number of suits were commenced in Yolo County in 1915 to enforce, as viewed by the Reclamation Board, extravagant prices for flood water flowage rights in the Yolo By-pass. These cases were removed to Sacramento County for trial after the Supreme Court reversed the Yolo County Superior Court's denial of motion for change of venue, but no proceedings have since been had and the suits have apparently been abandoned.

INJUNCTION AND SUIT AGAINST RECLAMATION DISTRICT No. 1500.

A suit was brought in 1915 by Samuel Gray (and other landowners on the east side of the Sutter Basin) against Reclamation District No. 1500, to enjoin the latter from closing its Tisdale and Sutter by-pass levees until the east levee of the Sutter By-pass should be constructed; the principal contention being that, inasmuch as the flood plane in Sutter Basin would be raised several feet by the closing of levees around Reclamation District No. 1500, lands to the east of the Sutter By-pass and theretofore above the elevation of flood waters, would be subject to damage by overflow after the closing of the levees of Reclamation District No. 1500 and prior to the construction of the east levee of the Sutter By-pass.

Judge Emmett Seawell of Sonoma County, presiding in the Superior Court of Sutter County where the action was brought, rendered a decision in favor of the injunction, which was granted, but this judgment was reversed by the Supreme Court, which held that, since all the levees of the Sutter and Tisdale by-passes are parts of the flood control plan adopted by the state and to be carried into execution through its representative, the Reclamation Board, any damage suffered temporarily on account of the construction of one portion of the by-pass prior to the

completion of the entire by-pass, must be endured in deference to the exercise by the state of its police power in the matter of flood control.

Although the Reclamation Board was not a party to this action, yet its outcome had a vital bearing upon the Sacramento Valley Flood Control Project in general, and upon the authority of the state in and about various features involved in its solution and realization.

APPENDIX.

APPENDIX A.

AGREEMENTS WITH SUTTER BASIN COMPANY REGARDING CASHING OF WARRANTS OF ASSESSMENT No. 6.

This Memorandum of Contract made this twenty-second day of January, 1918, by and between SUTTER BASIN COMPANY, hereinafter called the Company, and SACRAMENTO AND SAN JOAQUIN DRAINAGE DISTRICT, a corporation, acting through the Reclamation Board, hereinafter called the District,

WITNESSETH:

1. The Company agrees to convey to the District a right and easement over its lands lying in the Sutter By-pass south of Nelson Slough, excepting, however, the lands situated in Reclamation District No. 783, for the purposes described in the plans of the Reclamation Board, at the rate of twenty dollars ($20.00) per acre.

2. The Company also agrees to convey to the District a right and easement for similar purposes over its lands situated in what is known as Reclamation District No. 783, at the rate of two hundred and fifty dollars ($250.00) per acre.

3. It is understood and agreed that the District shall have the right to remove from the By-pass all brush and timber and dispose of the same, and the net proceeds arising from the sale, or other disposition of the same, shall be applied to the payment of the warrants held by the Sutter Basin Company, in accordance with this contract, to reduce the amount to be advanced by the Sutter Basin Company for clearing, as provided by this contract.

4. The Company agrees to cash all warrants that may be issued during the current year 1918 by the District for the clearing of the levees, brush and timber now existing in the Sutter By-pass south of Nelson Slough, in accordance with the plans of the Reclamation Board.

5. The District and the Reclamation Board, in consideration of the premises, do hereby agree that it, and they, will press as rapidly as possible the completion of the assessment of the Sutter By-pass and shall, at the earliest possible moment, make a call sufficient in size to redeem all warrants then outstanding, and that the Reclamation Board will press the clearing of the Sutter By-pass of brush, timber and levees as rapidly as possible during the year 1918, and while the District, or the Reclamation Board, can not bind itself, or themselves, to any particular date, it is the understanding of the parties that said Reclamation Board will expedite the making of the calls of such assessment and

all things connected therewith, so that a call upon such assessment sufficient to pay all warrants then outstanding shall be made on or before the first day of January, 1919.

6. It is understood and agreed that the easement to be conveyed is of the same general character as heretofore agreed to be conveyed by Sutter Basin Company and Sutter Basin Improvement Company to the District, it being understood that the Company reserves the right to use all of said lands over which an easement is to be granted, not inconsistent with the use for by-pass purposes.

7. It is understood and agreed that the Company will present an abstract of title to the District as soon as practicable and as soon thereafter as practicable the District will accept said title, if the same be good and merchantable, and upon the acceptance of title and delivery of deeds, will issue warrants for the amounts hereinabove specified.

8. It is understood and agreed that the land in the By-pass is not to be assessed for by-pass or flood control purposes.

9. It is understood and agreed that a more formal contract, in accordance with this memorandum, will be entered into by the parties hereto and this memorandum in substance expresses their view.

10. It is understood and agreed that the Company will accept the warrants of the Sacramento and San Joaquin Drainage District against Sutter-Butte By-pass Assessment No. 6 for the easement above described at the prices above named.

11. It is also to be understood that the easement above described shall be subject to all existing rights and easements now held and possessed by Reclamation District No. 1500, or agreed to be conveyed to said District.

In Witness Whereof, The parties hereto have executed this memorandum of contract and caused the same to be signed by their respective officers thereunto duly authorized, and have attached their respective corporate seals on the day and year first above written.

SUTTER BASIN COMPANY,
By W. E. GERBER,
President.
[SEAL] And by WM. H. DEVLIN,
Secretary.

SACRAMENTO AND SAN JOAQUIN DRAINAGE DISTRICT,
By A. B. FLETCHER,
President of Reclamation Board.
[SEAL] And by W. T. ELLIS,
Secretary of Reclamation Board.

This Contract, Made and entered into this twenty-fifth day of March, 1918, by and between SUTTER BASIN COMPANY, a corporation organized and existing under the laws of the State of California, having its principal place of business in the City of Sacramento, County of Sacramento, State of California, and hereinafter designated as the "Company," party of the first part, and SACRAMENTO AND SAN JOAQUIN DRAINAGE DISTRICT, acting by and through the Reclamation Board of California, hereinafter designated as the "District," party of the second part,

WITNESSETH:

That Whereas, A contract has heretofore been entered into on January 22, 1918, by and between said Company and said District, covering certain transfers in, and agreements regarding, the lower Sutter By-pass, in Sutter County, California, whereby said Company did in Section 4 of said contract agree to cash, at par upon presentation, all warrants issued during the current year 1918 by the said District, for the clearing of timber and brush and the reducing of existing cross levees in the lower Sutter By-pass, in accordance with the plans of the Reclamation Board of California;

And Whereas, Said District did, in Section 5 of said contract of January 22, 1918, agree to press as rapidly as possible the completion of the assessment of the Sutter-Butte By-pass Project, and make at the earliest possible moment a call sufficient in amount to redeem all warrants then outstanding, and would expedite such levying and spreading of assessment so that this call should if possible be made on or before January 1, 1919, although said District can not bind itself to any fixed or definite date in this matter;

And Whereas, Said Company, together with hundreds of other landowners, and also the State of California, are all vitally interested in the earliest possible completion of the work contemplated by the flood control plans of the Sutter-Butte By-pass Project, as adopted by the Reclamation Board of California;

And Whereas, Said District has on hand no funds whatever for the execution of said construction work, and under the existing legal plan of assessment can not secure any funds until a first call shall have been collected, which probably can not be accomplished before the first of January, 1919;

And Whereas, Said District, for the furtherance of the public interest, desires to commence said work as soon as possible, but can not do so unless some person or company, willing to assist the State of California in the immediate prosecution of said work, shall agree to advance money for the same by cashing warrants of said District prior

to collections from the first call of said assessment, and in the manner hereinafter stated;

And Whereas, Said Company—which, with many other landowners in the Sacramento Valley, is interested in the early completion of said Project—is willing to cash warrants, to an amount hereinafter stated which may be issued for such work during the current year 1918, for the purpose of enabling said District to commence said work at once, even though, as understood by said District, the interest being paid at the present time by said Company, for money which it is borrowing, is greater than the interest borne by said warrants which said Company is willing to cash at par for the purpose above stated;

And Whereas, It is deemed advisable by parties hereto that the understandings, agreements and obligations of the respective parties hereto should be placed in specific form;

Now Therefore, It Is Agreed, By and between the above respective parties as follows, to wit:

1. In addition to the purchase of warrants at par by said Company, as agreed upon in the said contract of January 22, 1918, the said Company hereby agrees to purchase, at par, face value, upon presentation, the following:

One hundred per cent of all warrants issued (against Sutter-Butte By-pass Assessment No. 6) for work performed by the clamshell dredges Armour and Gerber;

Seventy-five per cent of all warrants issued for at least four other clamshell dredges;

Seventy-five per cent of all warrants issued in payment for at least one dragline scraper;

One hundred per cent of all warrants issued in payment for survey parties, oil and water flotation, pumping and other necessary expenses in connection with the present construction work in the Sutter By-pass;

One hundred per cent of all warrants issued in payment for rights of way necessary to prosecute the immediate construction work in the Sutter By-pass;

One hundred per cent of all warrants which may be issued to the Sutter Basin Company for any work which it might do (as a Contractor at the rate of cost plus 10 per cent);

Provided, that the aggregate of all such warrants, face value, shall not exceed the sum of seven hundred fifty thousand dollars ($750,000.00).

2. The said District and said Reclamation Board shall press the levying of the Sutter-Butte By-pass Assessment Number Six with all possible speed and diligence so that the first call should be collectible, if possible, about, or very soon after, the first of January, 1919, and said District and said Reclamation Board will use all such power as

they, or either of them, may legally possess, to have said assessment levied, equalized, and a first call made on or about the first day of January, 1919, in an amount sufficient to pay all outstanding warrants issued or to be issued under the terms of this contract and cashed by said Company, and all other warrants outstanding and issued in payment for any of said work on said Sutter-Butte By-pass Project.

In Witness Whereof, The parties hereto have executed this contract and caused the same to be signed by their respective officers thereunto duly authorized and have affixed their respective corporate seals on the day and year first above written.

SUTTER BASIN COMPANY,
By [signed] W. E. GERBER,
President.
[SEAL] By [signed] WM. H. DEVLIN,
Secretary.
Party of the first part designated as the Company.

SACRAMENTO AND SAN JOAQUIN DRAINAGE DISTRICT,
By [signed] A. B. FLETCHER,
President of Reclamation Board.
[SEAL] By [signed] W. T. ELLIS,
Secretary of Reclamation Board.
Party of the second part designated as the District.

APPENDIX B.

FINANCIAL STATEMENTS.

The Department of Public Accounting of the State Board of Control submitted a "Report on examination of the books and records of account of the State Reclamation Board for the period July 1, 1916, to December 31, 1917," from which the following extracts are quoted:

Condition of Accounts and Records.

"The accounts and records of the Reclamation Board are in order. Comparison of endorsements on canceled checks with the original claims filed with the State Controller indicates that payments for the period under review have been properly made. The receipts coming into the custody of the Reclamation Board during the period have been properly accounted."

Per Diems of Board Members.

"The per diems paid to board members have been verified. The provision of section 9 of the Reclamation Board Act, that the per diems of any member shall not exceed $1,000.00 in any one year, has been complied with."

Accounting Procedure.

"The accounts and records of the Reclamation Board have been well kept in conformity with the procedure originally adopted. Changed conditions, however, have made changes in certain of the accounting methods desirable and a new procedure has therefore been prepared, which is submitted under separate cover. This revised procedure is designed in conformity with the requirements of the Reclamation Board Act, to develop directly from the ledger accounts financial reports at monthly intervals corresponding to Exhibits A, B, C and D accompanying this report."

In conformity with this revised procedure, the following statements have been compiled from the books and records of the Reclamation Board. These statements show the financial condition as of December 31, 1918.

STATE RECLA

EXHIBIT

Statement of Available Assets and

Available Assets.

Reclamation Board Fund		$6,032 23
Appropriation—Chapter 170, Statutes 1913	$6,032 23	
Sacramento and San Joaquin Drainage District Fund		312,417 68
General Assessment No. 1	$16,817 10	
Sacramento By-pass Assessment No. 3	292,554 43	
Freeport Levee Assessment No. 5	2,524 33	
Sutter-Butte By-pass Assessment No. 6	521 82	
Sundry bank accounts		14,521 29
Sacramento Valley Bank and Trust Co	$159 90	
California National Bank	13,761 39	
Sutter By-pass petty cash	600 00	
		$332,971 20
Excess of encumbrances over above funds (Exhibit B)		1,218,201 11
		$1,551,172 31
Revolving Fund, Chapter 686, Statutes 1915		$50,428 47
Cash Contingent Fund—Account C	$2,710 55	
Cash Contingent Fund—Vouchers paid not reimbursed	1,889 45	
Cash Contingent Fund—Revolving Expense Fund	400 00	
Subtotal	$5,000 00	
State Treasurer	18,867 33	
Claims paid not reimbursed	26,561 14	
Claims paid—not reimbursed		11,019 37
From General Assessment No. 1	$11,019 37	
Reimbursement warrants		2,963 76
Registered	$1,155 22	
Not registered	1,808 54	
Registered warrants receivable		41,832 97
Fremont Weir Site Assessment No. 4	$9,840 10	
Sutter-Butte By-pass Assessment No. 6	31,992 87	
Accounts receivable		864 30
Due from county treasurers	$4 72	
Due from sundry persons	859 58	
Assessments called—uncollected		330,134 79
General Assessment No. 1	$63,643 95	
Sacramento By-pass Assessment No. 3	39,538 53	
Fremont Weir Site Assessment No. 4	219,000 00	
Freeport Levee Assessment No. 5	7,952 31	
Assessments levied not called		12,124,522 25
Sacramento River Outlet Assessment No. 2	$1,500,000 00	
Sutter-Butte By-pass Assessment No. 6	10,624,522 25	
		$12,561,765 91

MATION BOARD.

A.

Liabilities as of December 31, 1918.

Liabilities.		
Approved claims payable		$2,290 76
From Revolving Fund	$180 45	
From other than Revolving Fund	2,110 31	
Registered warrants		1,300,351 81
Sacramento River Outlet Assessment No. 2	$3,042 78	
Fremont Weir Site Assessment No. 4	148,083 01	
Freeport Levee Assessment No. 5	7,905 81	
Sutter-Butte By-pass Assessment No. 6	1,141,320 21	
Warrants drawn for registry—not registered		92,983 70
Sacramento River Outlet Assessment No. 2	$650 59	
Fremont Weir Site Assessment No. 4	11,858 22	
Sutter-Butte By-pass Assessment No. 6	80,474 89	
Accrued interest		62,061 27
Sacramento River Outlet Assessment No. 2	$657 24	
Fremont Weir Site Assessment No. 4	20,043 69	
Freeport Levee Assessment No. 5	358 20	
Sutter-Butte By-pass Assessment No. 6	41,002 14	
Accounts payable		55,904 26
C. E. Williams	$10,000 00	
Sutter Basin Company	45,904 26	
Due funds for reimbursement		37,580 51
Revolving Fund	26,561 14	
Sacramento and San Joaquin Drainage District Fund Assessment No. 1	11,019 37	
		$1,551,172 31
Excess of encumbrances brought down		$1,218,201 11
Reserve for Revolving Fund		50,428 47
Chapter 686, Statutes 1915	$50,000 00	
Accretion—interest on reimbursement warrants	428 47	
		$1,268,629 58
Excess of collectible revenues over expenditures (Exhibit C)		11,293,136 33
		$12,561,765 91

STATE RECLAMATION BOARD.

EXHIBIT B.

Statement of Fund Balances and Encumbrances as of December 31, 1918.

	Balance in fund	*Encumbrances Against Funds.*								Net balance	Net encumbrance
		Approved claims payable	Registered warrants	Warrants drawn for registration not registered	Accrued interest	Accounts payable	Due Revolving Fund for reimbursement	Due No. 1 Fund for reimbursement	Total encumbrance		
Reclamation Board Fund—170/13	$1,092 22							$248 95	$248 95	$5,733 25	
General Assessment No. 1	16,817 10	$2,290 76							2,290 76	14,526 34	
Sac. River Outlet Ass't No. 2			$3,042 78	$570 59	$357 24		$95 70	424 93	4,841 24		$4,841 24
Sac. By-Pass Assessment No. 3	292,554 43							280 34	280 34	292,274 09	
Fremont Weir Site Ass't No. 4			148,069 01	11,856 22	20,043 69	$10,000 00	4,164 20	3,990 49	198,139 61		197,979 71
Sac. Valley Bank and Trust	159 90										
Freeport Levee Assessment No. 5	2,524 23		7,905 81		358 20		1,248 89	1,237 52	10,796 71		8,274 38
Sutter-Butte By-pass Ass't No. 6	521 82		1,141,339 21	80,474 89	41,092 14	45,904 26	6,012 84	3,978 77	1,318,698 11		1,318,309 00
California National Bank	12,761 29										
Sutter Basin Revolving Fund	600 00										
Inspection								149 40	149 40		149 40
Upper Sacramento River Project							2,814 80	264 49	3,079 29		3,079 29
Feather River Project							4,574 40	384 58	4,958 98		4,958 98
Kings River Project							198 98		198 98		198 98
Yolo By-pass							7,492 39	9 60	7,492 99		7,492 99
Totals	$332,971 20	$2,290 76	$1,300,351 81	$92,903 70	$62,051 27	$55,904 26	$26,561 14	$11,019 27	$1,551,172 21	$312,933 71	$1,530,784 82
Excess of encumbrances over balance (Exhibit A)	1,218,201 11									1,218,201 11	
	$1,551,172 21								$1,551,172 21	$1,530,784 82	$1,530,784 82

STATE RECLAMATION BOARD.

EXHIBIT C.

Statement of Revenues and Expenditures for the Period August 10, 1913, to December 31, 1918.

Expenditures.	
Assessment plant	$50,796 18
General operations	141,777 98
Inspection	416 02
Sacramento River Outlet Assessment No. 2	4,873 75
Sacramento By-pass Assessment No. 3	770,601 92
Fremont Weir Site Assessment No. 4	186,395 87
Freeport Levee Assessment No. 5	60,229 76
Sutter-Butte By-pass (Sutter) Assessment No. 6	1,274,222 68
Sutter-Butte By-pass (Butte) Assessment No. 6	421 33
Sacramento Valley Flood Control Project	19,822 08
San Joaquin Valley Flood Control Project	10,607 99
Upper Sacramento River Project	5,736 61
Lower Sacramento River Project	12 26
Feather River Project	8,973 99
Kings River Project	563 64
Yolo By-pass	8,712 48
Total expenditures	$2,564,691 04
Excess of collectible revenue over expenditures (Exhibit A)	11,252,536 33
	$13,817,227 37

Revenues.	Revenues collected	Collectible revenues
General Assessment No. 1	$168,356 05	$250,000 00
Sacramento River Outlet Assessment No. 2	----------	1,500,000 00
Sacramento By-pass Assessment No. 3	1,055,461 47	1,095,000 00
Fremont Weir Site Assessment No. 4	----------	219,000 00
Freeport Levee Assessment No. 5	50,211 39	58,163 70
Sutter-Butte By-Pass Assessment No. 6	----------	10,624,222 25
Total assessments	$1,292,028 91	$13,746,685 95
Interest and penalties collected—Delinquent Assessment No. 1	11,286 28	11,286 28
Interest and penalties collected—Delinquent Assessment No. 3	298 28	298 28
Interest and penalties collected—Delinquent Assessment No. 5	796 42	796 42
Revenue from State appropriation	43,067 77	50,000 00
Revenue from rental of lands	6,533 51	6,533 51
Revenue from sale of maps, plats, etc	166 10	166 10
Revenue from interest on savings account	107 43	107 43
Revenue from clearing land	521 82	792 82
Expenditures returnable	----------	598 56
	$1,355,078 82	$13,817,227 37
Excess of expenditures over revenues collected	1,168,412 52	----------
	$2,564,691 04	
		$13,817,227 37

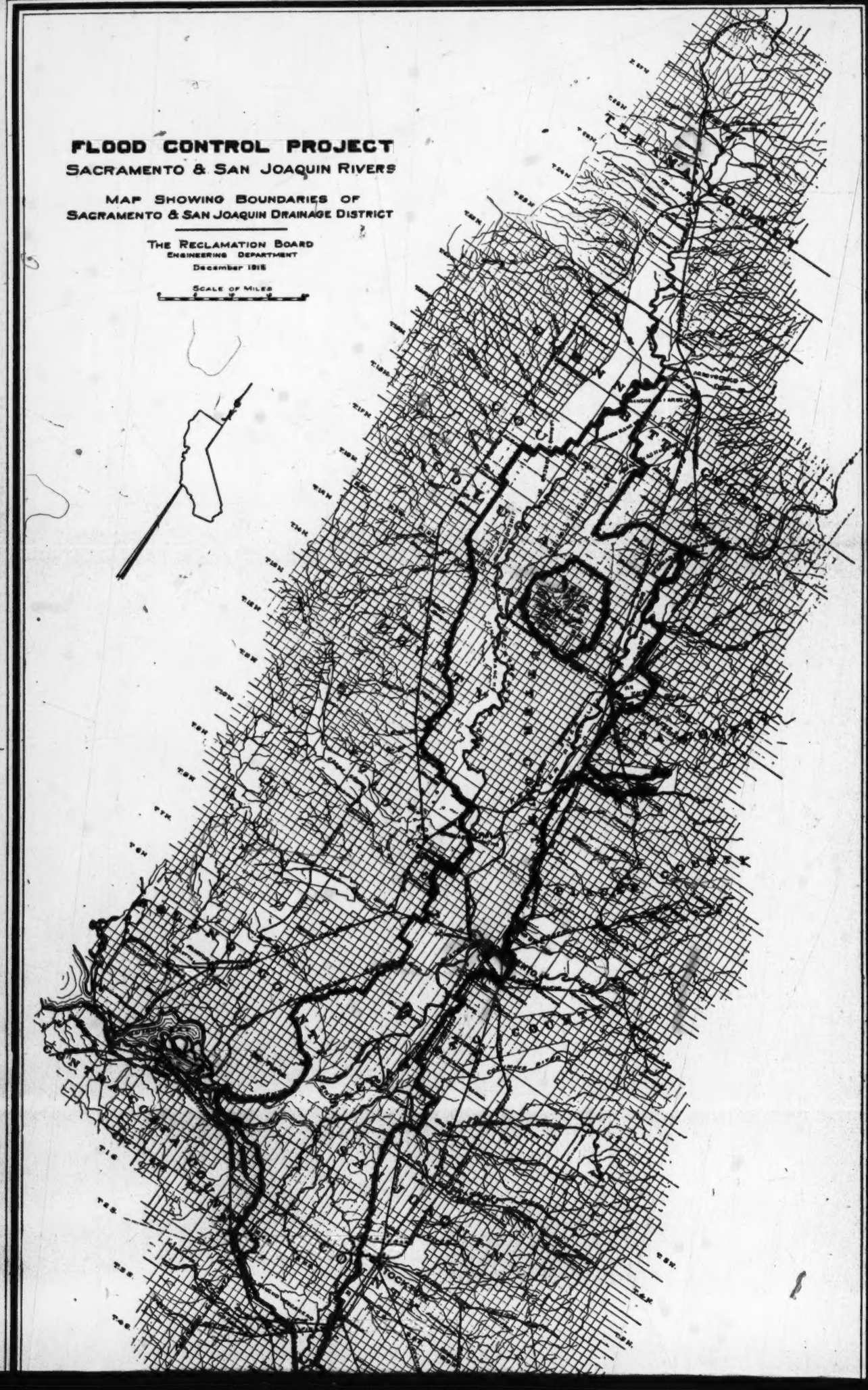
STATE RECLAMATION BOARD.

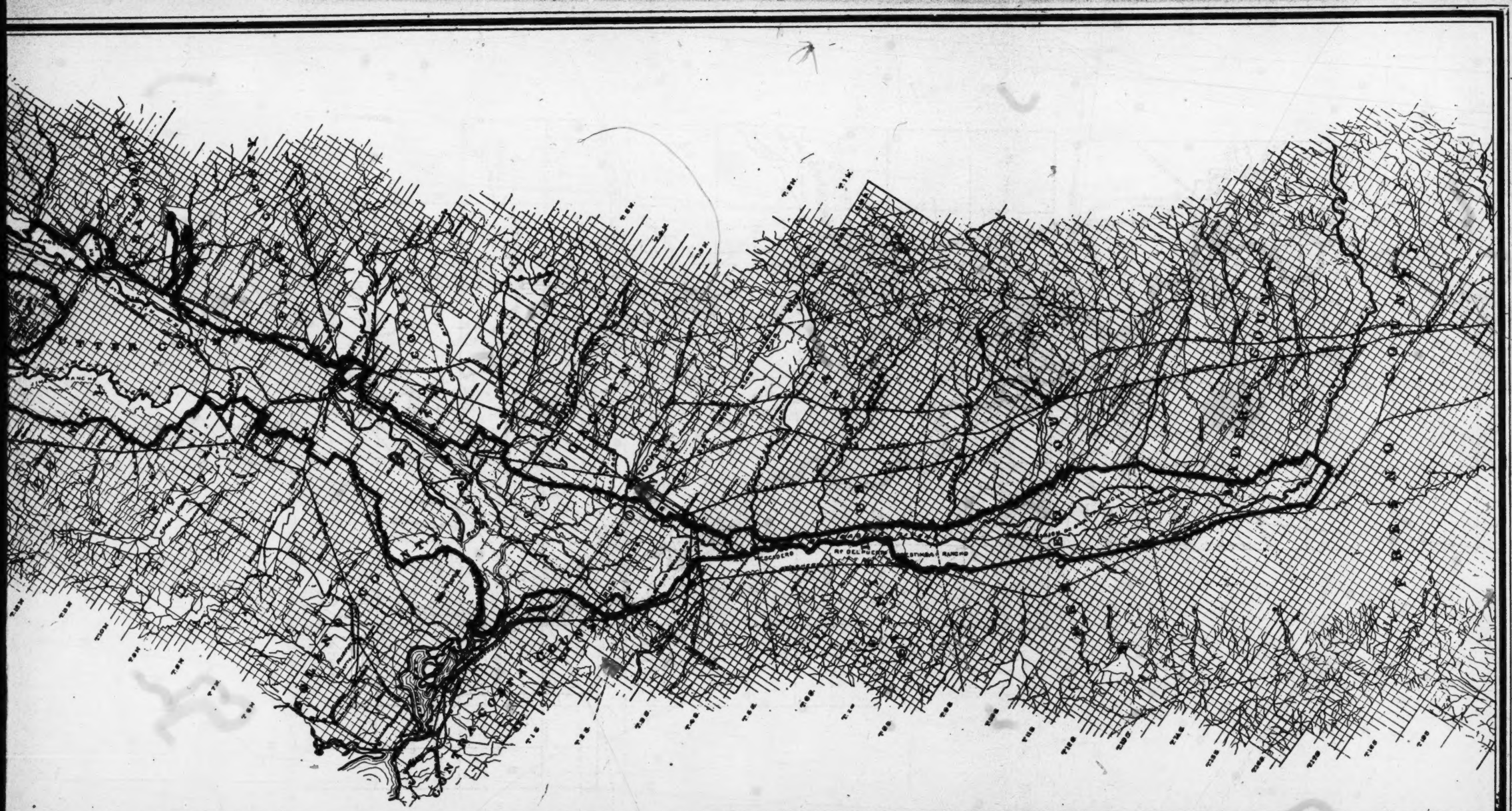
EXHIBIT D.

Analysis of Expenditures for the Period August 10, 1913, to December 31, 1918.

	Administrative	Legal	Engineering	Lands and rights of way	Assessment	Interest	Construction	Total
Assessment plant	$30,798 13							$30,798 13
General operations	64,517 10	$25,978 40	$27,402 31	$2,123 93	$18,756 10			141,777 93
Inspection			416 02					416 02
Sacramento River Outlet Assessment No. 2	29 22		366 75	160 47	601 94	$357 24	$3,028 13	4,577 75
Sacramento By-pass Assessment No. 3	451 40	94 29	10,455 56	332,751 37	12,890 20	38,618 33	345,231 37	770,601 52
Fremont Weir Site Assessment No. 4		30	1,348 02	137,810 74	7,300 20	21,329 08	15,607 52	186,305 87
Freeport Levee Assessment No. 5		1,433 08	4,220 50	6,434 91	4,563 96	403 65	42,942 72	60,229 76
Sutter-Butte By-pass (Sutter) Assessment No. 6	1,590 01	304 77	31,563 56	445,781 40	17,535 00	57,745 78	719,879 16	1,274,322 68
Sutter-Butte By-pass (Butte) Assessment No. 6			408 92	12 41				421 33
Sacramento Valley Flood Control Project			19,632 08					19,632 08
San Joaquin Valley Flood Control Project			10,607 99					10,607 99
Upper Sacramento River Project			5,736 61					5,736 61
Lower Sacramento River Project			12 26					12 26
Feather River Project			8,975 99					8,975 99
Kings River Project		6 20	550 44					556 64
Yolo By-pass	7 60	5,251 19	1,219 04	2,225 25				8,712 48
Totals	$97,392 86	$33,028 78	$123,686 14	$937,300 48	$61,679 49	$121,514 28	$1,126,788 91	$2,524,001 04

43732 2-19 2500


FLOOD CONTROL PROJECT
SACRAMENTO & SAN JOAQUIN RIVERS
MAP SHOWING BOUNDARIES OF
SACRAMENTO & SAN JOAQUIN DRAINAGE DISTRICT
THE RECLAMATION BOARD
ENGINEERING DEPARTMENT
December 1915
SCALE OF MILES
SHASTA COUNTY
TEHAMA COUNTY
GLENN COUNTY
COLUSA COUNTY
YUBA COUNTY
BUTTE COUNTY
SUTTER COUNTY
YOLO COUNTY
SACRAMENTO COUNTY
PLACER COUNTY
NEVADA COUNTY
SAN JOAQUIN COUNTY
STANISLAUS COUNTY
MERCED COUNTY
FRESNO COUNTY
Sacramento River
San Joaquin River
Feather River
Yuba River
American River
Cosumnes River
Mokelumne River
Stanislaus River
Tuolumne River
Merced River
Chowchilla River
Fresno River
Kings River
Kaweah River
Tule River
Kern River
Cache Creek
Putah Creek
Colusa Basin Drainage Canal
Sutter Bypass
Yolo Bypass
Delta
Suisun Bay
Carquinez Strait
Grizzly Bay
Honker Bay
Montezuma Slough
Suisun Slough
Cordelia
Benicia
Martinez
Pittsburg
Antioch
Stockton
Lodi
Woodbridge
Galt
Elk Grove
Florin
Folsom
Sacramento
West Sacramento
Davis
Woodland
Knights Landing
Colusa
Williams
Arbuckle
Maxwell
Willows
Orland
Chico
Oroville
Marysville
Yuba City
Live Oak
Gridley
Biggs
Red Bluff
Tehama
Corning
Anderson
Redding
Shasta
Keswick
Dam
Oakley
Byron
Tracy
Manteca
Ripon
Escalon
Oakdale
Modesto
Turlock
Ceres
Hughson
Waterford
Newman
Gustine
Los Banos
Dos Palos
Firebaugh
Mendota
Fresno
Clovis
Sanger
Reedley
Dinuba
Selma
Kingsburg
Lemoore
Hanford
Visalia
Tulare
Exeter
Lindsay
Porterville
Delano
Wasco
Shafter
Bakersfield
Kern
Buttonwillow
Tulare Lake
Kern Lake
Goose Lake
Buena Vista Lake
Elevation 4000
Elevation 3000
Elevation 2000
Elevation 1000
Elevation 500
Elevation 250
Elevation 100
Elevation 50
Elevation 25
Elevation 10
Elevation 5
Elevation 0
Elevation 5 Below
Elevation 10 Below
Elevation 25 Below


UNION COUNTY
ROCKERS
RANCH

N.

BUTTE CO.

GLENN CO.

COLUSA CO.

YUBA CO.

SUTTER CO.

YOLO CO.

SACRAMENTO CO.

SOLANO CO.

Oroville

SACRAMENTO

WOODLAND

Knights Landing

Colusa

Princeton

Grimes

Meridian

Willows

Orland

Gridley

Biggs

Marysville

Yuba City

Live Oak

Sutter

Nicolaus

Davis

Dixon

Winters

Vacaville

Suisun City

Fairfield

Vallejo

Benicia

Dunnigan Hills

Sutter Buttes

Cache Creek

Putah Creek

Sacramento River

Feather River

Yuba River

Bear River

Colusa Basin Drain

Knights Landing Ridge Cut

Tule Canal

Cortina Creek

Stony Creek

Elkhorn Slough

Lurline Slough

Montezuma Slough

Suisun Slough

Cordelia Slough

Ulatis Creek

Putah South Canal

Vaca Pipeline

Solano Project

Delta Cross Channel

Sacramento Deep Water Channel

Sacramento Weir

Fremont Weir

Yolo Bypass

Yolo Causeway

Knights Landing Ridge Cut

Colusa Basin Drain

Tule Canal

Cortina Creek

Stony Creek

Elkhorn Slough

Lurline Slough

Montezuma Slough

Suisun Slough

Cordelia Slough

Ulatis Creek

Putah South Canal

Vaca Pipeline

Solano Project

Delta Cross Channel

Sacramento Deep Water Channel

Sacramento Weir

Fremont Weir

Yolo Bypass

Yolo Causeway

T.22N.R.1W.

T.21N.R.1E.

T.20N.R.1W.

T.19N.R.1E.

T.18N.R.1W.

T.17N.R.1E.

T.16N.R.1W.

T.15N.R.1E.

T.14N.R.1W.

T.13N.R.1E.

T.12N.R.1W.

T.11N.R.1E.

T.10N.R.1W.

T.9N.R.1E.

T.8N.R.1W.

T.7N.R.1E.

T.6N.R.1W.

T.5N.R.1E.

T.22N.R.2W.

T.21N.R.2W.

T.20N.R.2W.

T.19N.R.2W.

T.18N.R.2W.

T.17N.R.2W.

T.16N.R.2W.

T.15N.R.2W.

T.14N.R.2W.

T.13N.R.2W.

T.12N.R.2W.

T.11N.R.2W.

T.10N.R.2W.

T.9N.R.2W.

T.8N.R.2W.

T.7N.R.2W.

T.6N.R.2W.

T.5N.R.2W.

T.22N.R.3W.

T.21N.R.3W.

T.20N.R.3W.

T.19N.R.3W.

T.18N.R.3W.

T.17N.R.3W.

T.16N.R.3W.

T.15N.R.3W.

T.14N.R.3W.

T.13N.R.3W.

T.12N.R.3W.

T.11N.R.3W.

T.10N.R.3W.

T.9N.R.3W.

T.8N.R.3W.

T.7N.R.3W.

T.6N.R.3W.

T.5N.R.3W.

T.22N.R.4E.

T.21N.R.4E.

T.20N.R.4E.

T.19N.R.4E.

T.18N.R.4E.

T.17N.R.4E.

T.16N.R.4E.

T.15N.R.4E.

T.14N.R.4E.

T.13N.R.4E.

T.12N.R.4E.

T.11N.R.4E.

T.10N.R.4E.

T.9N.R.4E.

T.8N.R.4E.

T.7N.R.4E.

T.6N.R.4E.

T.5N.R.4E.

T.22N.R.5E.

T.21N.R.5E.

T.20N.R.5E.

T.19N.R.5E.

T.18N.R.5E.

T.17N.R.5E.

T.16N.R.5E.

T.15N.R.5E.

T.14N.R.5E.

T.13N.R.5E.

T.12N.R.5E.

T.11N.R.5E.

T.10N.R.5E.

T.9N.R.5E.

T.8N.R.5E.

T.7N.R.5E.

T.6N.R.5E.

T.5N.R.5E.

T.22N.R.6E.

T.21N.R.6E.

T.20N.R.6E.

T.19N.R.6E.

T.18N.R.6E.

T.17N.R.6E.

T.16N.R.6E.

T.15N.R.6E.

T.14N.R.6E.

T.13N.R.6E.

T.12N.R.6E.

T.11N.R.6E.

T.10N.R.6E.

T.9N.R.6E.

T.8N.R.6E.

T.7N.R.6E.

T.6N.R.6E.

T.5N.R.6E.

LEGEND

LEVEES

1. Completed to approved grade
2. Almost up to standard
3. In course of construction
4. Not yet constructed

Sacramento and San Joaquin Drainage District Boundary

Reclamation and Levee District Boundaries

County Lines

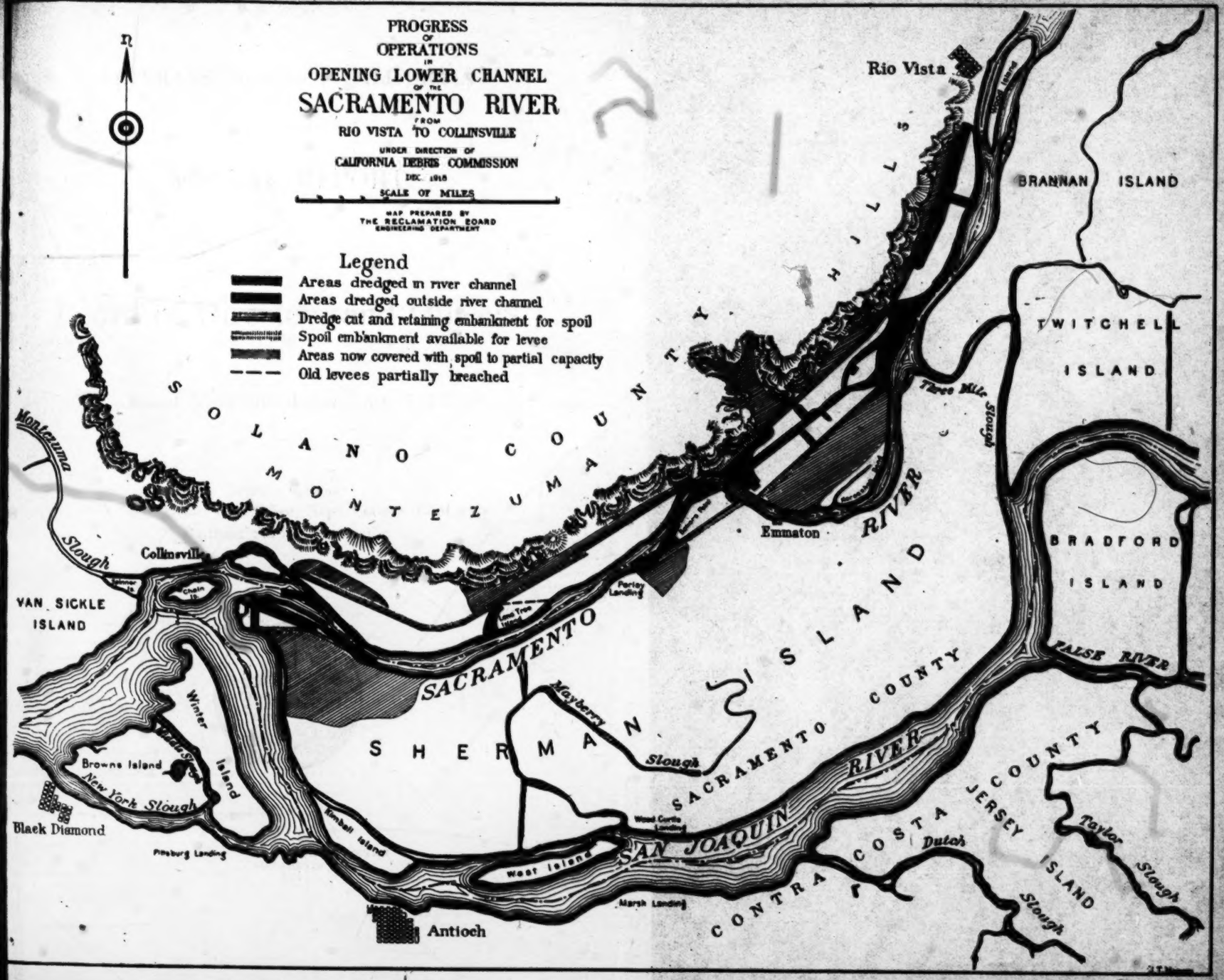
FLOOD CONTROL PROJECT
SACRAMENTO RIVER

MAP SHOWING
BY-PASSES - ADOPTED AND PROPOSED,
PROGRESS OF LEVEE CONSTRUCTION,
AND RECLAMATION DISTRICTS.

THE RECLAMATION BOARD
ENGINEERING DEPARTMENT

Date
December 1918

Scale in Miles


PROGRESS
OF
OPERATIONS
IN
OPENING LOWER CHANNEL
OF THE
SACRAMENTO RIVER
FROM
RIO VISTA TO COLLINSVILLE
UNDER DIRECTION OF
CALIFORNIA DEBRIS COMMISSION
DEC. 1918
SCALE OF MILES
MAP PREPARED BY
THE RECLAMATION BOARD
ENGINEERING DEPARTMENT
N
Legend
Areas dredged in river channel
Areas dredged outside river channel
Dredge cut and retaining embankment for spoil
Spoil embankment available for levee
Areas now covered with spoil to partial capacity
Old levees partially breached
Rio Vista
BRANNAN ISLAND
TWITCHELL ISLAND
Three Mile Slough
SOLANO COUNTY
MONTEZUMA HILLS
Montezuma Slough
Collinsville
Emmaton
SACRAMENTO RIVER
BRADFORD ISLAND
VAN SICKLE ISLAND
Chain Is.
Peytey Landing
Long Tree Island
SACRAMENTO ISLAND
FALSE RIVER
Mayberry Slough
SHERMAN
SACRAMENTO COUNTY
Winter Island
Three Mile Slough
Browns Island
New York Slough
Black Diamond
Pittsburg Landing
Kimball Island
Wood Curtis Landing
SAN JOAQUIN RIVER
West Island
Marsh Landing
Antioch
CONTRA COSTA COUNTY
JERSEY ISLAND
Dutch Slough
Taylor Slough